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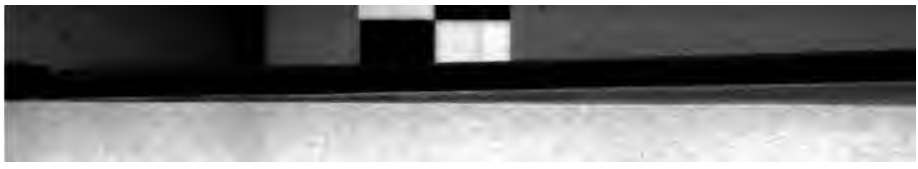
March, 1898.











ELEVENTH ANNUAL REPORT

OF THE

STATE BOARD OF HEALTH

OF

NEW YORK.

TRANSMITTED TO THE LEGISLATURE, FEBRUARY 20, 1891

VOL. I.

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STATE OF NEW YORK.

No. 58.

IN ASSEMBLY,

FEBRUARY 20, 1891.

ELEVENTH ANNUAL REPORT

OF THE

STATE BOARD OF HEALTH.

To the Honorable DAVID B. HILL,

Governor of the State of New York:

SIR.—I have the honor to transmit herewith the Eleventh Annual Report of the State Board of Health of New York, together with maps and appended papers.

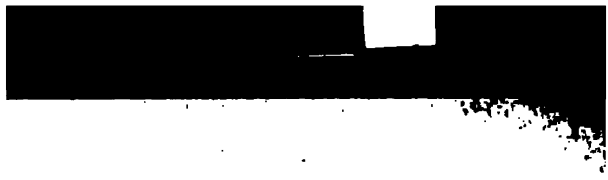
Very respectfully,

Your obedient servant.

LEWIS BALCH,

Secretary.

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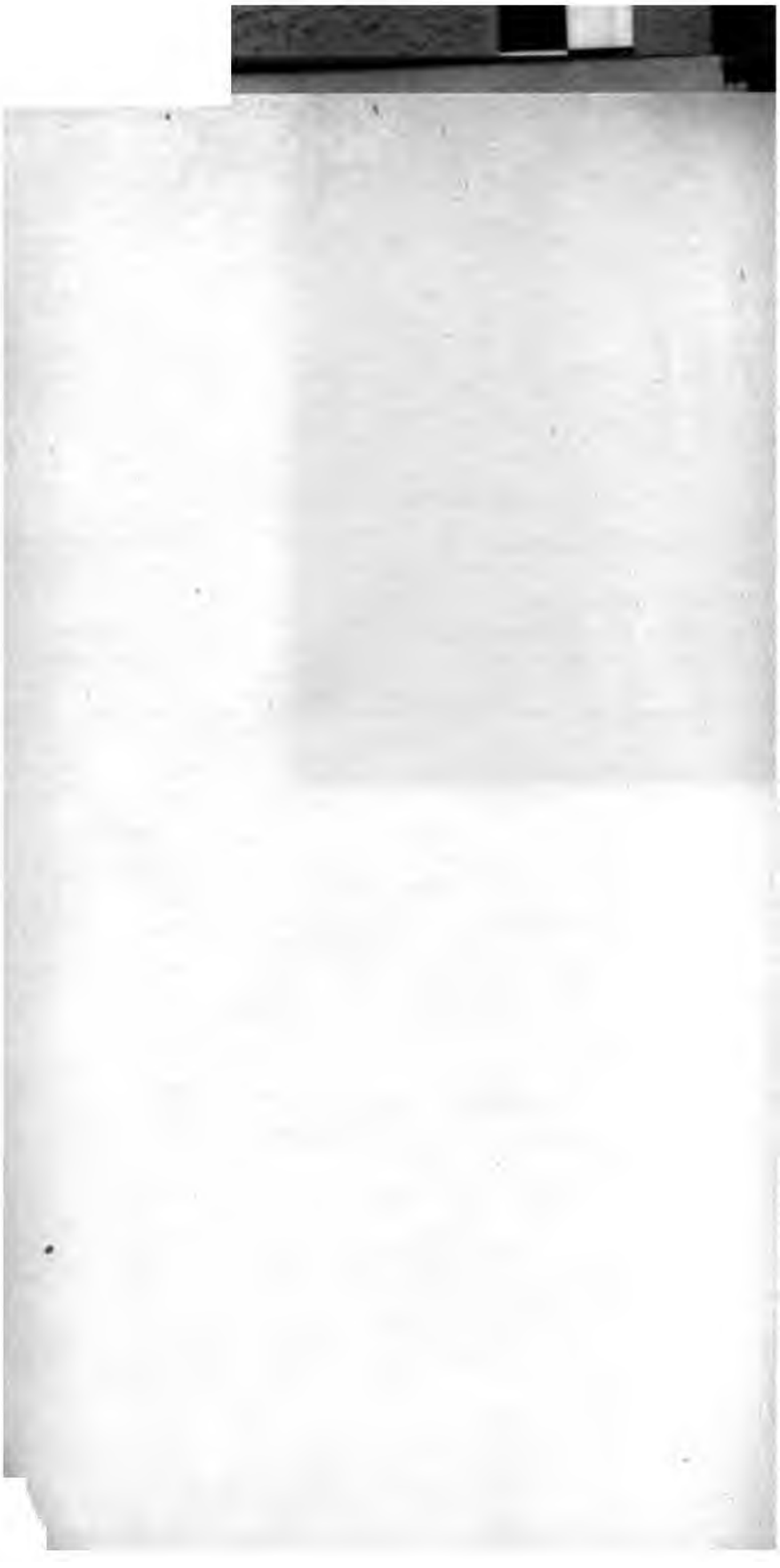
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STATE SUPERINTENDENT OF REGISTRATION AND VITAL STATISTICS.

LEWIS BALCH, M. D., - - - *As Secretary of the Board.*



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REPORT.

To his Excellency, DAVID B. HILL,

Governor of the State of New York:

SIR.—The State Board of Health presents its Eleventh Annual Report, which contains a record of its work during the year 1890. Its various features will be briefly touched upon.

THE SANITARY CONDITION OF THE STATE.

The reports of vital statistics during 1890 were the most complete of any year since the organization of the State Board of Health. There were but fifteen or twenty towns in the entire State that failed entirely to make reports of mortality, and, it is estimated that, the mortality of not more than 50,000 population, or less than one per cent of the total population of the State, failed of being recorded. Up to the close of the year 1890 there have been received the reports of 117,100 deaths. Adding to these the probable deaths which occurred in towns failing to report, which, at the rate of sixteen deaths per 1,000 population, would amount to 800, we have a death rate for the entire State for the year of 19.65 per 1,000 population. This was the death rate as closely as it could be estimated, including the mortality both of city and of country.

The most extraordinary occurrence during the year was the outbreak of epidemic influenza, which was

under way when the year opened. The force of the epidemic fell upon the month of January, producing a much larger number of deaths than ever occurred during this month, amounting as it did, including all returns received after the issue of the bulletin for the month, to over 13,000. This was 5,000 in excess of the average for this month for the preceding five years, and 2,000 more than occurred in the month of July, which is always a month of high mortality on account of the prevalence of diarrhœa. That this increase was due to influenza is shown by the fact, that the actual number of deaths from zymotic diseases was considerably less than in the preceding January. There were 4,000 more deaths reported than in the month of January of 1889, and it is safe to say that this was the amount of mortality to be credited to this epidemic for the month. It continued into the succeeding months, and its effects were heard from for a long time after as contributory to deaths. No separate record was kept of the deaths occurring from this disease, and in fact but a comparatively small number were reported as due entirely to it, but a moderate estimate would credit the epidemic with causing 5,000 deaths during the first four months of the year that apart from it would not have occurred. It is credited for the most part to local diseases, of which the major part fell upon acute diseases of the respiratory organs; the digestive, nervous and other systems all felt its influence, and persons weakened by age or constitutional disease, of whatever sort, succumbed to it. It caused a thousand more deaths from January to May than all the zymotic diseases combined.

It caused nearly one death in each 1,000 population during the course of the year, and it is probable that not less than from forty to fifty per cent of the population were affected lightly or severely by the disease, though of this we have no exact record.

The zymotic mortality as a whole was low, as compared with the total mortality, during the entire year, and in fact the actual number of deaths from these causes was less than in either of the three years that preceded it. Taking the amount of reporting population at 5,500,000 there were 3.51 deaths per 1,000 population from zymotic diseases during 1890; 3.90 in 1889; 4.12 in 1888 and 3.96 in 1887. Typhoid fever had a lower mortality and no special prevalence came to the knowledge of the board. Measles, as will be seen by tables in a detailed report on the sanitary condition of the State, which may be found at another place in this volume, varies immensely in prevalence, sometimes causing one per cent of the total mortality and sometimes seventeen per cent; there was an increase in its prevalence in the spring and later it diminished, causing for the year less than one per cent of all deaths. From scarlet fever the State has been more free than for years. Diphtheria also seems to steadily decline in prevalence, but there is still room for a further diminution, since it caused but a little less than forty-five deaths per 100,000 population during the year. As suggested in the report already referred to, the question of most importance in connection with the disease now is, how to manage it and to eradicate it from accumulations of population that have attained to the grade of

the city, where this is a vastly more complex matter than in the retired rural locality. Small-pox caused but four deaths during the year, two of which were reported from New York city, the others occurring in Cohoes and Dansville. There has been no case of the disease in the State since July.

Consumption has caused, with little variation, its usual quota of mortality, about twelve per cent of all deaths. Much interest in a disease which produces a larger number of deaths than any other and in measures for its control, is always felt, and the entire world has had its attention turned during the latter part of the year to the discovery of Professor Koch of Berlin, that it apparently admits of cure under some favoring conditions. No more important incident in the history of consumption has ever occurred than this gives promise of being, but it is necessary to await the lapse of some time yet to demonstrate how much is to be looked for from it.

The present year, 1891, sets in without the existence of any disturbing element, of noteworthy importance, in any part of the State, in the condition of its sanitary affairs.

PLANS FOR SYSTEMS OF SEWERAGE AND SEWAGE DISPOSAL.

Eleven plans for the sewerage of villages have been presented to the board during the year, under the provisions of chapter 375 of the Laws of 1889.

Lansingburgh sought an extension of its present sewer system, the greater part of the village being already provided with sewers. Maps of the sewers already constructed and of the new sewers proposed, as approved by the State Board, are given in the appendix.

The plans for the village of Geneseo as finally completed were presented early in the year and approved. Later a slight change was desired which was permitted. These are shown in the appendix with the reports of the engineer designing the works and the reports of the engineers of the State Board. The question of river pollution came up in this connection and was settled by allowing the discharge of the raw sewage from the village into the Genesee, as the river is not used to any appreciable extent for potable purposes below the village and is too great in volume for so small an amount of sewage to produce a marked deleterious effect.

The village of Albion presented plans which provided for sewage purification by filtration through sand before discharge into the small stream available to carry off the polluted water. The plans of Holley, also, as finally completed and approved, provided for the same method of disposal. The approval of each of these plans was accompanied by a series of cautionary remarks inscribed on the plans as to the methods of maintenance to prevent the production of nuisances.

Gouverneur submitted outlines for a complete system of sewers for the village. After a careful consideration of all the circumstances of this case it was decided to allow the discharge of the sewage into the Oswegatchie river without treatment. The data upon which this decision was based are given in the report of the board's engineer.

Medina sought approval for a system of sewers and cellar drains discharging directly into Oak Orchard creek. This was given upon the adoption of the necessary

regulations to prevent the use of the cellar drains as sewers. The regulation was necessary as these drains emptied into the creek within the thickly settled limits of the village. The discharge of the main sewer into the creek, below the village, was allowed for reasons given in the engineer's report.

Walton's plans were also approved as they agreed in general with the ideas of the board as expressed in the last annual report.

The village of Suspension Bridge presented a project for a system of sewers on the separate plan discharging into the Niagara river just above the rapids, which was duly approved.

The village of Waterville, through its board of health, asked for a change in the plans for the village sewer system approved last year, with the idea that such change would facilitate the construction of the sewers, that had been voted down when submitted to the voters. The proposed change did not accord with the views of all the people interested, nor did it meet with the approval of the State Board of Health.

White Plains presented a diagram showing a change in the plans for their system of sewers, which was approved. Upon request of the board of trustees an engineer was sent to the village to inspect the portion of the sewers already constructed and report upon the quality of the work done and the methods of construction employed. His report is given in the appendix.

Plans have been received from the villages of Sidney and Malone but they are not yet in the shape required

by the board and have not yet been approved. Requests for information and advice and notices of the formation of sewer commissions have been received from the villages of Wellsville, Rouse's Point and Glens Falls, and it is probable that they will present plans during the next year.

WATER SUPPLIES.

The city of Amsterdam and the villages of Cobleskill and Oneonta have applied to the Board to make rules and regulations for the sanitary protection of their water supplies. These rules have been made and are or will shortly be in full force. All three of the supplies are from small streams with limited water-shed, and reservoirs. The rules are, therefore, quite similar in their features and have but few differences to fit them to local peculiarities. A report upon the sources of pollution of each water supply accompanies the set of rules adopted and is given in the appendix.

GENERAL SANITARY INVESTIGATIONS.

Upon request of citizens of Stamford an engineer was sent to report on the feasibility of a system of sewerage for the village and to make an approximate estimate of the cost of the same, as it was deemed desirable to arouse public opinion on the subject. The question of the pollution of the stream near the proposed outlet was important, and some comparison of the construction of disposal works, and a long outlet pipe, is made in the report.

The city of Jamestown is preparing to construct a system of sewers for the corporation, and, as a pre-

liminary, asked the advice of the State Board upon the question of sewage disposal. The stream into which the sewage is to be discharged is not large, but is fairly constant in volume, being fed by Chautauqua lake; and it was thought, that it would provide a sufficient dilution for the sewage of a population of 7,000 to 10,000, but that, considering the size and the probable growth of the city, it would be advisable to so construct the outlet as to allow the building of disposal works when necessary. The stream is not used for domestic purposes, nor are any of the streams into which its waters flow on their way to the sea, until Oil City, Pennsylvania, is reached, at a distance of more than 100 miles, and there are no places of appreciable size between the two cities.

A system of sewerage and sewage disposal for the Institution for the Blind at Batavia was submitted to the Board in accordance with law, and has been approved. The plans and report of the engineer thereon are given in the appendix. The local conditions in this case were such, that a system of disposal requiring purification was deemed necessary, and the plan submitted provided for such.

Complaints of the method of disposal of the sewage of the Long Beach hotel caused the local board of health to ask the counsel of the State Board in the matter. The engineer sent down to examine the case reported in substantial agreement with the ideas of the local board, and a better method of disposal, which would cause less nuisance and injury to the neighborhood and would conform with the law, was recommended.

A bad condition of some thickly settled streets in the town of Waterford, outside of the limits of any village, was the cause of a visit and a report which recommended that the board of health institute a system of water-tight cess-pools to be emptied at frequent intervals as a temporary expedient, and apparently the only one available, until the territory in question could be incorporated in some village or a subscription for a sewer could be secured.

The city of Newburgh has had much trouble with diphtheria for several years and the latest outbreak, shortly after the opening of the fall term of school, was the occasion of considerable alarm and some controversy as to its cause. By some it was attributed to a school-house, as a number of the cases occurred among pupils in that school. Upon request of the board of education a medical inspector and an engineer were sent to make inspections of the premises, and to investigate as far as possible the cause of the outbreak. The conclusions of the two inspectors, as given in their reports, are, that the school-house was not responsible for the outbreak, nor was it more responsible for the spread of the disease than other public buildings, and that more strict measures should be taken to quarantine all patients than has been customary. Some improvements in the school-house were recommended.

Among the nuisances arising from lack of efficient drainage that have come to the notice of the Board during the past year are the following: A small pond lying partly in Albany and partly in Schenectady county was the cause of much controversy, and it was recom-

mended that the county line road, running through the pond, be made a continuous embankment and each town be required to take care of its own portion of the land subject to overflow.

A question as to the drainage of some swamp lands in the neighborhood of Waterloo, was found on investigation to be capable of settlement under an old law under which the lands had at one time been drained.

An investigation of a statement, that a portion of the village of Springwater was overflowed by backwater from Hemlock lake, on account of a dam placed at its mouth by the city of Rochester, developed the fact, that no dam had been constructed at the mouth of the lake, nor had one been built by the city on the outlet, and that no lands were overflowed by the lake, except some low lands at the head, some two miles from the village, which could have no appreciable effect upon the healthfulness of the same.

The city of Ithaca has had more or less trouble, from the backing up of the water of Cayuga lake over the lower portions of the city, ever since the aqueduct carrying the Erie canal over the Seneca river was built. This trouble has been greater during the last year or two, on account of the exceptionally wet seasons, and was the cause of an appeal to the State Board for an investigation and report upon the cause of the inundations. Much work has been done on the Seneca river for the two purposes, of draining the marshes along its course and compensating for the obstruction caused by the building of the aqueduct and the approaches thereto. An abstract of the reports of the investigations preceding the carrying out of plans for this work

accompanies the report of the engineer of the Board who was sent to make the inspection. It is evident, that much of the trouble in the past has been due to the obstructions caused by the improvements to the canal made by the State. Much has been done by the State to mitigate the effect of these obstructions, but there is considerable difference of opinion as to whether the work done is to be considered as sufficient. There is evidence to show that the floods at Ithaca before the building of the aqueduct were much shorter in duration than since that structure was finished. Other impediments to the flow, some due to the State and some to private works and to highway bridges are in the river, and it is rather difficult to arrive at a decision as to the question of the adequacy of the compensation for the aqueduct. The removal of the smaller obstructions would soon settle this question.

THE HUDSON RIVER.

The inspection of the Hudson river, which was begun last year, has been continued during this year. A partial report of the work done is presented by the engineer. The undertaking is one of great magnitude, and the results thus far obtained demonstrate that it is of great importance. As shown in the report, the work done in the investigation of the river is thus far of the nature of an inspection to show the actual uses of the river. An estimate is made of the amount of pollution reaching the river from the various sources, cities, villages, manufacturing establishments, etc., and the degree of concentration of the pollution is estimated. It will be

necessary, in order to arrive at results that can be understood, to determine as carefully as possible the degree of dilution by the water flowing in the stream into which the polluting liquid flows. The maps accompanying the report show the results obtained graphically, and appeal to the eye, and thus to the understanding, more forcibly perhaps than columns of figures. The magnitude of the interests that are jeopardized, by the use of the river and its tributaries as sewers, is shown by the portion of the report which gives the statistics of the ice industry and of the water-works of cities and villages, which draw their supply from the streams of the water-shed of the Hudson, below chances of serious pollution from sewerage systems and manufacturing refuse. As stated in the last report of the State Board, it is a serious question to be answered, whether the river shall be abandoned to its uses for purposes of drainage and sewerage, or whether it shall be preserved in as nearly pure a condition as possible, so that it can be used for potable purposes as it has been in the past to so great an extent. A trouble to be met with in abandoning the river to use as a sewer is, the extreme difficulty found in several instances of securing other sources of water supply. This point is shown in some degree in the engineer's report. The river has been used for both purposes for many years, but the report shows that the amount of pollution is increasing. It is also believed to be the case, that the average low water flow of the river is somewhat less than it was formerly, owing to the rapid removal of floods in these later days. This trouble is likely to increase if the steps taken to preserve the forests of the Adirondacks

do not succeed in reaching the desired object. It is then probably a question of but a short time until the further use of the river for the double purposes will be impossible.

But one side of the investigation of the river has yet been touched. The determination of the amount of pollution entering the river has been made in great part. The effect of this pollution upon the water of the river remains to be studied. This study should be made along two lines, the chemical and the biological. The chemical examination of water has been the one most generally made in the past. This method of examination is sufficiently developed to be capable of giving results, which can be interpreted with considerable certainty in the light of past experience, and with the aid of the information obtained by the inspection as reported in this volume and other information to be obtained in connection with the collection of samples for analysis. It should be carried out with great thoroughness and detail, the samples being collected according to a definite plan. This examination, with the accompanying data of stage of water, amount of dilution, conditions of weather, ice, etc., will give a clear idea of the chemical effects of the polluting materials on the water and the amount of purification of the water which takes place during the flow from one place of pollution to another. The determination of the fact, as to the increase in pollution being greater or less than the purifying effect, will be a very important point. It is well known, that the river water is full of microscopic life, the character of which depends, to a great extent, upon the nature of

the substances contained in the water upon which these organisms can feed. The presence of disease germs in the water is inferred by some from the fact, that they are known to be discharged into the water and from the fact that they have, in a few cases, been found in running water; also the number of bacteria in the water is believed to depend, other things being equal, upon the amount of impurity in the water upon which they can feed, and the determination of this number would therefore be an important indication, in connection with the chemical analyses, as it shows, whether the impurities shown in the chemical analyses are in an inorganic and innocuous form, or are still active organisms, or the organic food for such organisms, with the possibility of being dangerous to human life if taken into the system. In particular cases where the probability of pollution by dangerous substances is great, more extended examinations should be made to determine the character of the bacteria found, and a study of the effect of the diluting medium upon the growth of the noxious organisms should be undertaken. This, chemical analyses can not determine. They can only give statements of the amount of organic matter present, but can not give the character of this matter definitely. The biological analyses, properly made, can give information as to the character of the organic pollution in the water and the organisms which feed upon it, and they are therefore believed to be equally important as the chemical analyses.

With the results of these three lines of investigation at hand it will be possible to give a definite statement

of the facts and to draw conclusions of value as to the use of the river and the restrictions thereof which are necessary. When the magnitude of the interests involved is seen, the necessity of the investigation and of its early completion will be evident. The Board has carried the investigation to this point with but little difficulty with the funds at its disposal. Whether the completion of the investigation on the scale that is necessary to give the results the highest value can be done without further outlay is a question.

Similar investigations on a smaller scale (of which results have been published), have been made of rivers in Massachusetts, of the Passaic river in New Jersey, of the Schuylkill river in Pennsylvania, and of the Illinois river, all of which demonstrate the feasibility, the necessity and the great value, from an economic point of view, of the investigation. In many ways the proposed investigation of the Hudson will be an improvement upon any that has gone before. It is proposed to make it more complete, and the results will possess greater definiteness and be capable of giving a more solid basis for practical work on that account.

INVESTIGATIONS BY ORDER OF THE GOVERNOR.

An important matter was referred by the Governor to the State Board of Health for investigation under the provisions of section 8 of its organic law; namely, the petition of the Rockaway Park Improvement Company against certain industries conducted on Barren island. The investigation was in line with many others previously made by the Board, into the operations of cognate industries carried on in the vicinity of Newtown

creek. As great interests were involved, able counsel appeared for both sides and an unusual tax was made upon the time of the Board. A patient hearing was afforded all parties concerned, but as the result is fully reported in the proper place in the appendix, no further reference need be made here.

Another important reference was made by the Governor for investigation and report upon the complaint of Sea Cliff against the Glen Cove starch works. As the ground covered by this investigation was substantially embraced in a former report on this subject, it will only be necessary here to allude to it, as found in the Fourth Annual Report as well as to the present statement of the case as found in the Appendix.

By chapter 316 of the Laws of 1890, an appropriation of $56,000 was made for improving the sanitary condition of the Capitol upon plans approved by the State Board of Health. The defects in its drainage and ventilation had been previously shown by the Board, and plans to remedy these were prepared by Superintendent Perry, and received the approval of the State Board of Health.

The work has been proceeded with upon these plans and has been pushed forward rapidly and reached a satisfactory degree of completeness. The great evil suffered in the past, resulting from lack of provision to get rid of the foul air of the building has been remedied by a system of conduits discharging at points where no possibility exists of defiling the fresh air supply. The rate at which the impure air is being discharged has been tested by the anemometer and found to be

sufficient for sanitary requirements. More still remains to be done, the unexpected difficulties encountered delaying the work and it is proposed to continue the improvements in the spring. For details of the work accomplished and present status reference is made to the proper chapter in the appendix.

ADULTERATION OF FOOD AND DRUGS.

The two analysts of the Board have been actively engaged during the year in the examination of drugs and medicinal chemicals. Many of the most important food articles are by law placed under the supervision of another department of the State service, and as the appropriation for food and drug work is insufficient to admit of a thorough investigation of both fields, it has been deemed the wisest course for the analysts to devote themselves chiefly to the examination of drugs. During the year 286 samples of alkaloidal preparations (quinine pills and capsules, morphine pills and tablets, etc.,) and 543 samples of other drugs and pharmacopœial preparations have been examined, making a total of 829 samples for the year and a total of 3,417 samples examined since the work was begun on the present plan in September, 1885. The reports of the analysts will be found elsewhere. The feeling of hostility to the work which was at one time evinced by many manufacturers and dealers has in large part given place to a general willingness to co-operate with the Board in correcting abuses, and it is believed that much good has been accomplished by the continuous work of the analysts in exposing sophistications and calling attention to errors in

the manufacture and sale of medicinal preparations. In a large number of cases, these sophistications and errors have resulted from carelessness or ignorance rather than from a deliberate intent to deceive or defraud the public; and it is believed, that such abuses are best corrected by the methods adopted by the Board, which might perhaps be thought too lenient by those who have not studied the existing conditions in the drug trade in this State. Pharmacy is rapidly becoming a science and its practice a profession, and the work carried on by the Board has had a direct and important influence in raising the business of the pharmacist to a higher plane. Certainly in no calling are thorough knowledge and skill, honesty and accuracy more essential than in pharmacy, and the number of pharmacists possessing these qualifications is rapidly increasing, largely as a result of existing laws.

Respectfully submitted.

THOMAS NEWBOLD,
President.
WILLIAM E. MILBANK, M. D.
THOMAS S. DAWES, M. D.
FLORENCE O. DONOHUE, M. D.
MAURICE PERKINS, M. D.
JOSEPH D. BRYANT, M. D.
WILLIAM M. SMITH, M. D.,
Health Officer of Port.
CHARLES F. TABOR,
Attorney-General.
LEWIS BALCH, M. D., PH. D.,
Secretary and Executive Officer.

APPENDIX.

ELEVENTH ANNUAL REPORT

OF THE

STATE BOARD OF HEALTH.



REPORT OF THE EXECUTIVE AND FINANCE COMMITTEE.

TRAVELING AND NECESSARY EXPENSES OF MEMBERS.

1889.			
Sept.	30.	Frederick Carman, expenses on official duty..	$23 40
	30.	Lewis Balch, expenses on official duty	45 20
Oct.	5.	W. E. Milbank, expenses on official duty	20 35
	14.	Alfred Mercer, expenses on official duty.....	49 36
	25.	Lewis Balch, expenses on official duty	88 94
Nov.	4.	M. Perkins, expenses on official duty.....	59 23
	18.	Frederick Carman, expenses on official duty..	19 25
	18.	Lewis Balch, expenses on official duty	27 70
	29.	Thomas Newbold, expenses on official duty..	55 52
Dec.	21.	Frederick Carman, expenses on official duty..	18 50
	21.	Lewis Balch, expenses on official duty	12 20
1890.			
Jan.	1.	Alfred Mercer, expenses on official duty.....	20 08
	28.	Lewis Balch, expenses on official duty	29 00
Feb.	14.	Lewis Balch, expenses on official duty	47 70
	15.	Frederick Carman, expenses on official duty..	15 69
	24	F. O. Donohue, expenses on official duty	26 12
	24.	Lewis Balch, expenses on official duty	18 76
March	6.	W. E. Milbank, expenses on official duty	39 90
	7.	Frederick Carman, expenses on official duty..	15 91
	14.	Thomas S. Dawes, expenses on official duty..	26 00
	20.	Maurice Perkins, expenses on official duty...	29 92
	21.	Frederick Carman, expenses on official duty..	17 98
	21.	Lewis Balch, expenses on official duty	30 70
	29.	Lewis Balch, expenses on official duty	41 13
April	1.	Frederick Carman, expenses on official duty..	15 85
	2.	F. O. Donohue, expenses on official duty ...	64 84
	2.	Wm. E. Milbank, expenses on official duty...	35 95
	3.	Maurice Perkins, expenses on official duty...	51 74
May	19.	Lewis Balch, expenses on official duty	15 55
	19.	Frederick Carman, expenses on official duty,	11 60
	19.	F. O. Donohue, expenses on official duty	44 14
	22.	W. E. Milbank, expenses on official duty	23 75
	31.	Maurice Perkins, expenses on official duty...	53 31

1890.			
June	19.	Lewis Balch, expenses on official duty	$19 80
	24.	F. O. Donohue, expenses on official duty	22 84
	24.	Frederick Carman, expenses on official duty,	12 76
	30.	Lewis Balch, expenses on official duty	22 75
Sept.	3.	Thomas S. Dawes, expenses on official duty	37 00
	9.	F. O. Donohue, expenses on official duty	44 04
	10.	Lewis Balch, expenses on official duty	45 76
	10.	Frederick Carman, expenses on official duty,	16 25
	25.	Frederick Carman, expenses on official duty,	4 05
	29.	Maurice Perkins, expenses on official duty	62 35
		Total	$1,382 87

SPECIAL EXPERT AND TEMPORARY SERVICE.

1889.			
Oct.	5.	Robert White, balance due for rent of steam launch	$93 00
	8.	Charles C. Brown, salary and expenses for inspection of Hudson river.	253 02
	8.	Arthur Hollick, inspecting Barren island	60 20
	14.	F. C. Curtis, investigating nuisance at Philmont	11 50
	25.	Thomas S. Jones, Jr., office assistance	9 00
	28.	Grace B. Winne, indexing	60 00
	28.	M. Libbie Edwards, indexing and registering	94 20
Nov.	4.	Emil Kuichling, engineering	270 37
	8.	C. C. Brown, engineering	130 65
	14.	M. Libbie Edwards, registering	60 00
	18.	F. C. Curtis, medical inspections	39 43
	25.	Grace B. Winnie, indexing	60 00
Dec.	2.	Libbie Edwards, registering	69 00
	16.	Arthur Hollick, report on effluvium nuisances.	5 00
	16.	Charles C. Brown, engineering	185 52
	16.	M. Libbie Edwards, registering	52 50
	16.	Thomas S. Jones, Jr., office assistance	7 50
	21.	Grace B. Winne, indexing and tabulating	68 00
1890.			
Jan.	4.	M. L. Edwards, registering	30 00
	4.	Charles C. Brown, engineering	220 07
	4.	Emil Kuichling, engineering	110 04
	15.	F. C. Curtis, medical inspection	14 44
	28.	Grace B. Winne, tabulating	68 40
Feb.	1.	M. L. Edwards, registering and type-writing	79 90

1890.			
Feb.	3.	Charles C. Brown, engineering	$143 41
	27.	Grace B. Winne, indexing and tabulating	59 80
Mar.	1.	M. L. Edwards, typewriting and registering,	40 50
	7.	Thomas S. Jones, Jr., office assistance	16 00
	8.	Charles C. Brown, engineering	112 23
Apr.	2.	M. Libbie Edwards, registering	28 50
	3.	Grace B. Winne, indexing and recording transcripts	54 60
	15.	Charles C. Brown, engineering	180 91
May	9.	Charles C. Brown, engineering	97 79
	9.	Emil Kuichling, engineering	139 31
	9.	G. B. Winne, indexing journals for three years,	64 20
	9.	F. C. Curtis, medical inspection	21 00
	31.	M. L. Edwards, registering	124 50
June	2.	Grace B. Winne, indexing	62 40
	2.	T. M. Prudden, biological analyses of sewage,	50 00
	4.	Thomas S. Jones, Jr., office assistance	5 00
	27.	F. C. Curtis, medical inspection	17 68
	30.	G. B. Winne, indexing, etc	60 60
	30.	M. Libbie Edwards, registering	84 00
July	1.	Edward B. Jones, office assistance	2 00
	1.	Charles C. Brown, engineering	210 09
	25.	Grace B. Winne, indexing	63 60
	31.	Edward B. Jones, office assistance	20 00
Aug.	1.	M. L. Edwards, registering	105 00
	5.	Charles C. Brown, engineering	261 20
	5.	L. J. Little, assistance on Hudson survey	183 65
Sept.	3.	Edward B. Jones, office assistance	25 00
	8.	M. Libbie Edwards, indexing	96 00
	8.	M. Libbie Edwards, typewriting	23 20
	8.	M. Libbie Edwards, registering	52 50
	9.	Grace B. Winne, indexing, etc	64 00
	9.	Charles C. Brown, engineering	234 08
	9.	L. J. Little, engineering	149 16
		Total	$4,903 65

SALARIES AND WAGES.

1889.			
Oct.	31.	Salaries for month	$1,150 00
Nov.	30.	Salaries for month	1,150 00
Dec.	31.	Salaries for month	1,150 00

1890.			
Jan.	31.	Salaries for month	$1,150 00
Feb.	28.	Salaries for month	1,150 00
Mar.	31.	Salaries for month	1,150 00
April	30.	Salaries for month	1,150 00
May	31.	Salaries for month	1,150 00
June	30.	Salaries for month	1,150 00
July	31.	Salaries for month	1,150 00
Aug.	31.	Salaries for month	1,150 00
Sept.	30.	Salaries for month	1,150 00
		Total	$13,800 00

PRINTING AND STATIONERY.

1889.			
Dec.	3.	James B. Lyon, printing 200 copies Regulations for Croton Watershed and Tributaries,	$5 00
	3.	Felix H. McCann, one copy Sadlier's Catholic	
1890.		Almanac	1 25
Dec.	23.	Fergus Halpen, printing wrappers, etc	55 75
April	15.	R. K. Quayle, steel plate headings	21 58
June	18.	Fergus Halpen, printing cards and envelopes,	69 50
July	28.	R. K. Quayle, steel plate printing	16 67
Sept.	27.	Argus company, printing monthly bulletin, etc.	1,189 06
	27.	James B. Lyon, printing extracts from reports, etc	164 35
		Total	$1,523 16

TELEGRAPHY AND TELEPHONE.

1889.			
Oct.	5.	Western Union Telegraph Co., September	$3 93
	5.	Hudson River Telephone Company, September	5 90
Nov.	8.	Hudson River Telephone Company, October,	5 10
	16.	Western Union Telegraph Company, October,	5 38
Dec.	4.	Hudson River Telephone Company, November	5 20
	4.	Western Union Telegraph Co., November	3 33
1890.			
Jan.	4.	Hudson River Telephone Company, December	5 75
	4.	Western Union Telegraph Co., December	1 62
Feb.	6.	Hudson River Telephone Company, January,	5 20
	6.	Western Union Telegraph Company, January,	2 20
March	8.	Western Union Telegraph Company, February	3 71
	8.	Hudson River Telephone Company, February	5 10

1890.			
April	2.	Hudson River Telephone Company, March...	$5 40
	15.	Western Union Telegraph Company, March..	11 36
May	9.	Western Union Telegraph Company, April...	4 70
	9.	Hudson River Telephone Company, April...	5 30
June	6.	Western Union Telegraph Company, May....	7 33
	6.	Hudson River Telephone Company, May. ...	5 10
July	1.	Hudson River Telephone Company, June....	5 55
	1.	Western Union Telegraph Company, June...	5 65
Aug.	1.	Hudson River Telephone Company, July.....	5 00
	4.	Western Union Telegraph Company, July....	1 92
Sept.	3.	Western Union Telegraph Company, August,	2 80
	3.	Hudson River Telephone Company, August..	5 00
		Total	$117 53

LIBRARY, MAPS AND CHARTS.

1889.			
Oct.	10.	B. Westerman, books.....	$2 31
Nov.	4.	Journal Comparative Medicine, subscription,	3 00
Dec.	21.	Engineering News, subscription.....	5 00
1890.			
Jan.	28.	Lea Bros. & Co., National Medical Directory,	14 00
Feb.	24.	B. Quinn, subscription Railway Guide.....	5 00
	24.	B. Westerman & Co., subscriptions to Analysist, Sanitary Record and Revue d'Hygiene	11 80
March	8.	R. L. Polk & Co., books	10 00
	11.	Sanitary Engineer, subscription.....	4 00
May	9.	The Sanitarian, subscription	4 00
	9.	B. Westerman & Co., books.....	18 99
June	14.	Sampson, Murdock & Co., Albany Directory..	3 00
July	1.	J. R. Bien, maps of Staten Island.....	33 00
	31.	B. Westerman, books.....	5 14
Sept.	11.	B. Westerman & Co., German publications...	2 50
		Total	$121 74

FURNITURE.

1890.			
Jan.	28.	B. W. Wooster Furniture Co., one office chair,	$5 00
April	2.	Van Heusen, Charles & Co., drop-light.....	3 00
		Total	$8 00

PETTY CASH.

1889.			
Nov.	4.	S. G. Speir, typewriter supplies	$1 50
Dec.	16.	William H. Roberts, one copy minutes General Assembly, 1889	1 50
1890.			
Jan.	28.	Albany News Co., diary 1890	1 50
Feb.	27.	T. F. Romeyn, cases	10 00
	27.	Stuart G. Speir, typewriter supplies	3 00
June	1.	Frederick C. Manning, stationery	3 35
July	1.	W. M. Thomas, Jayne speed attachment to typewriter	3 00
	28.	George L. Russell, carriage hire	8 00
	31.	Health Department, New York, vaccine points,	4 50
		Total	$36 35

SUMMARY.

Traveling and necessary expenses	$1,382 87
Special expert and temporary service	4,903 65
Salaries and wages	13,800 00
Printing and stationery	1,523 16
Telegraph and telephone	117 53
Library, maps and charts	121 74
Furniture	8 00
Petty cash	36 35
Total	$21,893 30

Investigations by Order of the Governor.



BARREN ISLAND.

NEW YORK, *January* 16, 1891.

To the Honorable DAVID B. HILL, *Governor of the State of New York:*

SIR. — The State Board of Health has the honor to report as follows in the matter of the investigation of Barren Island industries:

On the fourteenth of October there was received from the Governor the following letter and petition.

STATE OF NEW YORK:

EXECUTIVE CHAMBER,
ALBANY, *October* 14, 1890.

Dr. LEWIS BALCH, *Secretary State Board of Health, Albany, N. Y.:*

DEAR SIR. — I am directed by Governor Hill to refer to your attention the inclosed communications in the matter of alleged nuisance on Barren island in the county of Kings, and to ask that the Board of Health make an investigation into the charges there presented and report the results of its investigation to the Governor.

Very respectfully yours,

T. S. WILLIAMS,
Private Secretary.

To the Honorable DAVID B. HILL, *Governor of the State of New York:*

The petition of the Rockaway Park Improvement Company, Limited, respectfully shows to your Honor:

I.

Your petitioner is a corporation duly created by and existing under and in pursuance of the State of New York and has its principal office at Rockaway Park on Rockaway Beach in Hempstead, Queens county, New York. Annexed hereto is a plat or map showing your petitioner's property, the title to which it has acquired in fee.

II.

Your petitioner was incorporated for the purpose of purchasing this land, developing it, laying out parks, walks, drives and villa plots thereon, and it has expended large sums of money in improving said land and has laid out streets and avenues, graded and paved, on said property and beautified it in many ways rendering it an attractive locality for residence purposes. There have been erected on said property a number of cottages and residences and a number of your petitioner's lots have been sold and disposed of to private persons under restrictions limiting their use to residence purposes, and by reason of the situation of the land in question on the Atlantic ocean and adjacent to the large cities of New York and Brooklyn, your petitioner's property and franchise are of great value to your petitioner. The chief attraction of the premises to your petitioner, and to those persons who have purchased its land and erected houses thereon for themselves and their families, is the pure air and healthy character of the surroundings.

III.

At the entrance to Jamaica bay, which bounds your petitioner's land on the west, and about a mile distant from Rockaway Park, is located a small island, about a mile in length, known as Barren island, shown on the official government chart hereto annexed. This island is occupied by certain factories, the offensive character of which are notorious, and which threaten the destruction of your petitioner's property and the property of those who have located thereon, and which seriously endanger the health of the entire population of Rockaway Beach and the adjoining villages of Far Rockaway, Lawrence, Cedarhurst and Woodsburg, in Queens county, as well as Coney Island, Sheepshead Bay and other localities in the county of Kings.

IV.

Repeated complaints have been made by your petitioner, and by the inhabitants of the localities named, against the operations of these factories. The local board of health of Flatlands, in the county of Kings, in whose jurisdiction Barren island is located, have been importuned to take some action to suppress the nuisance created by the business carried on on the island, but without effect. Petitions have been heretofore addressed to the honorable the State Board of Health, signed, as your petitioner is informed and believes, by nearly all the property owners from Rockaway Park to Woodsburg, and as your petitioner is informed and believes, the said State Board has

caused an inspection of said island, and has endeavored to compel said local board to take the necessary action to abate the nuisance complained of, but without relief to the complainants, and this petition is addressed to your excellency, as well on behalf of all those persons heretofore complaining against these factories as in the particular interest of your petitioner, one of the chief sufferers from the nuisance complained of.

V.

Barren island is occupied by a factory conducted by the firm of Peter Whites Sons, consisting of Andrew J. White and Thomas F. White; by a factory operated by E. Frank Coe and J. D. Fairchild, and by factories operated by the Barren Island Oil and Guano Company, or the Barren Island Fertilizing Oil Company, the true name being unknown to your petitioner, the business of which is carried on by one Goodkind and Sternfels, as superintendents, and by one. Wurfurnier, their first names being unknown to your petitioner.

VI.

At the factory of Peter Whites Sons, all the dead animals collected in the streets of the city of New York are deposited; the refuse of the abattoirs, garbage, decayed vegetables, condemned meat, offal and refuse of every description is brought to this factory and rendered and disposed of in various ways. On an average there are over 2,000 hogs kept on the factory premises, and in the carrying on of the business referred to the dead animals are dismembered and boiled, and oils extracted therefrom. In handling and treating this animal matter and other refuse material, most foul and sickening vapors are created and carried on the wind to the surrounding territory. Your petitioner's land is peculiarly exposed to these foul odors, and along Rockaway beach and as far away as Woodsburg these vapors and smells are carried on the wind, rendering the inhabitants sick and destroying the comfort and enjoyment of their homes.

The same is true of the factory of E. Frank Coe and J. D. Fairchild. This factory manufactures fertilizers, and in the operation of its business uses the refuse from all the other factories on the island, which is treated with sludge acid and other compounds, producing a most sickening stench, which can be detected at a great distance from the island when carried on the wind.

The other factories, two in number, carry on the manufacture of fish oil. Large quantities of fish are brought to the island and deposited on exposed unenclosed platforms, to be thereafter boiled and rendered. The fish is allowed to accumulate and rot on the plat-

forms, and the operation of boiling is carried on in open tanks, all causing a most unhealthy and indescribable odor. The smells from these fish factories are so powerful that it is impossible to keep the doors or windows of dwelling-houses open when the wind blows from them in the direction of Rockaway, and many persons have been made sick and subjected to all possible discomfort by reason of the offensive transactions complained of.

VII.

On July , 1890, the grand jury of the county of Kings having investigated the complaint of your petitioner and other residents in the vicinity of Barren Island, made a presentment, a certified copy of which is annexed hereto. By said presentment the said grand jury declare the factories complained of to be a public nuisance, and call for the suppression thereof.

Your petitioner, therefore, prays that your excellency may, by appropriate order in pursuance of the statute in such case made and provided, direct the abatement of the nuisances herein complained of and the suppression of the unlawful business above described, or that the matter be referred to the honorable the State Board of Health for examination and report, to the end that on the coming in of such report an order as above prayed for may be issued forthwith.

And your petitioner will ever pray, etc.,

Dated NEW YORK, *October* , 1890.

THE ROCKAWAY PARK IMPROVEMENT CO. (Limited.)

By F. W. DUNTON, *President.*

Attorney for Petitioner.

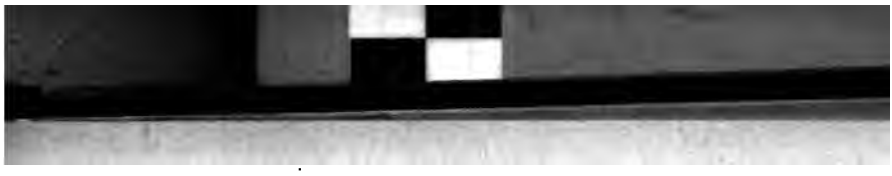
STATE OF NEW YORK, }
CITY AND COUNTY OF NEW YORK. } ss.:

Frederick W. Dunton, being duly sworn, deposes and says that he is the president of the Rockaway Park Improvement Company, the petitioner above named. That the foregoing petition is true to the knowledge of deponent, except as to the matters therein stated to be alleged upon information and belief, as to which matters he believes it to be true.

F. W. DUNTON.

Sworn to before me this 6th }
day of October, 1890. }

JOSEPH H. JONES,
Notary Public, New York county.



GRAND JURY ROOM,
COURT-HOUSE, KINGS COUNTY,
July 18, 1890.

To the Honorable HENRY A. MOORE, *County Judge, Court of Sessions, Brooklyn, N. Y.:*

DEAR SIR.—The grand jury of Kings county for the July term, 1890, respectfully make the following presentment:

Complaint has been made by citizens on Rockaway Beach, Far Rockaway, Lawrence and Woodsburg, of the existence of a public nuisance on Barren island, in the town of Flatlands, in this county, caused by the operation of certain factories on that island.

We find that the business carried on at Barren island by Thomas F. White, Andrew White and E. Frank Coe, The Barren Island Fertilizing Oil and Guano Company, is of a most offensive character. The garbage, offal and dead animals which accumulate in the city of New York, are brought into this county to Barren island, and are rendered, boiled and treated in such a manner as to create nauseating and offensive odors, which are carried by the wind for a long distance, causing great discomfort and injury to those encountering these vile smells. Fish-oil factories on Barren island allow fish and fish scrap to accumulate on open platforms and rot, causing most sickening stenches, and a fertilizing factory, which mixes the refuse from the other establishments for fertilizing purposes, using sludge acid and other offensive compounds, all causing an indescribable foul-smelling vapor which is carried into the houses of the complainants causing much discomfort, damage and sickness.

The existence of a business of this description in a locality which is rapidly filling up with dwellings and private residences, and adjacent to the breathing spots of the citizens of Brooklyn and of Kings county, should not be permitted.

At the time Barren island was first occupied for these purposes, it was isolated and the noxious character of the enterprises was not so noticeable, but the marked improvement and development of the surrounding territory of Barren island has become a crying public nuisance, calling for action on the part of the public authorities looking toward the prohibition of the offensive trades carried on there.

EDWARD L. ADAMS,
Foreman.

STATE OF NEW YORK, } ss.:
COUNTY OF KINGS.

I, BERNARD J. YORK, clerk of the Court of Sessions in and for the county of Kings (said court being a court of record, having common-law jurisdiction, a clerk and seal), do hereby certify that the annexed is a copy of presentment of July term, 1890, grand jury, filed July 18, 1890, and now on file in the clerk's office of said court, and the same has been compared by me with the original, and is a correct transcript therefrom, and of the whole of such original.

Given under my hand and attested by the seal of the said court this twenty-sixth day of July, in the year of our [SEAL.] Lord one thousand eight hundred and ninety.

BERNARD J. YORK,
Clerk.

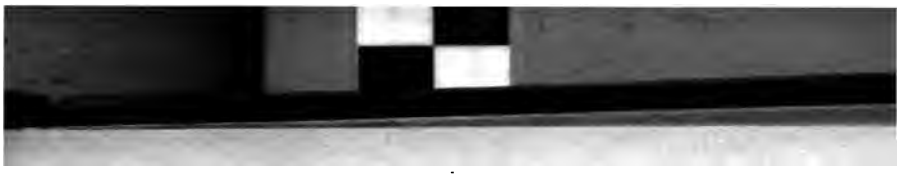
In accordance with these instructions, a special meeting of the board was called on October 18, 1890, and a committee, consisting of the president, Hon. Thomas Newbold, Commissioner Donohue and Secretary Balch, appointed to examine into the nuisances alleged to exist on Barren island.

The secretary, in company with Mr. Arthur Hollick, Ph. D., visited the island October 24, 1890, a very stormy day, no intimation of their visit being given to the manufacturers. On November 5, 1890, due notice having been given all parties concerned in the matter, Drs. Donohue and Balch, with Assistant Secretary Carman and Mr. Hollick, made a full inspection of all the manufactories on the island.

November fifth, the committee sat at the Everett House, Seventeenth street, New York city, to hear such testimony as might be given before it. This hearing was adjourned to the twenty-fifth of the month, when further testimony was taken, and the counsel engaged agreed to submit briefs within the following two weeks. On the sixteenth instant at a special meeting in New York, the committee reported the evidence taken, the briefs submitted by counsel, also the various reports of the expert employed. Copies of these will be found appended.

BARREN ISLAND.

The island is situated in the southwestern part of Jamaica bay; is about two miles long by three-quarters wide; distant from Canarsie, three and one-half miles south; from Lawrence and



Rockaway about six to four and one-half west and a little south of west. From Manhattan Beach Hotel it is two miles east and a little north. From Rockaway park it is two miles west.

The factories on the island, from the most southerly one, are fertilizer works (superphosphate), operated by E. Frank Coe; a fish factory by B. Sternfels; rendering works and pig-pens, owned by Messrs. P. White's Sons and the Barren Island Oil Guano Company. At the latter factory fish-scrap is made. A school, two boarding-houses, a club-house, and some dwellings, complete the buildings. In all about 400 poople live upon the island.

THE FERTILIZER WORKS.

Here is manufactured a superphosphate, made by a mixture of phosphate rock, wood, blood, bone, fish-scrap and sulphuric acid. There is no nuisance from any one ingredient when by itself, but in the mixing. The parts are mixed by weight and give off a pungent acid smell, very disagreeable to sensitive stomachs and very penetrating. In former years when sludge acid was treated on the island and used, the nuisance was greater. But no sludge acid has been treated there for three years — the manufacturers buying sludge acid from which the tar has been separated previous to shipment, thereby doing away with much offensive material. After the fertilizer is made it is stored in sheds from which, as needed, it is barreled for shipment. In 1884 the State Board, then investigating the nuisance on Barren island, recommended that wooden conduits, furnished with a fan blower, be so constructed that all fumes arising from the mixture be carried to a condenser. This was done, but owing to an agreement entered into by Mr. Coe with the Manhattan Beach Hotel, whereby the works were not to be operated during June, July and August, these flues were allowed to get out of order and the fan was not kept in regular running. The boarding of the storage sheds and the flues from them were also neglected. On the day of the secretary's visit, and on that when the committee examined, much the same condition existed. The works were clean and the fan working, but not satisfactorily.

STERNFEL'S FISH FACTORY.

By steamers generally, fish called either menhaden or moss-bunkers are brought in great quantities during the months from May until November, boiled in open wooden kettles by steam,

pressed for the oil and the residue, or "scrap," spread upon platforms in the rear of the works to dry. In wet weather the scrap is placed in a shed and wet down with sulphuric acid. The fumes from the cooking and from the scrap shed are allowed to escape into the open air. There was a marked difference in the condition of this place on the fifth of November from that on the twenty-fourth of October. It had been improved by cleaning, but the main conditions remained the same. Conflicting testimony was given concerning this factory, it being contended that the scrap was allowed to rot on the platforms on the one hand, and on the other that no such things took place. The State Board recommended, in its former visit, that the vats be covered and all vapors condensed, but no move in this direction has ever been made by the manufacturers.

WHITE'S RENDERING WORKS.

This firm has the contract with the city of New York to remove all dead animals and offal from the the city and with several of the large hotels to take their garbage. The matter is brought to the island on what is called the "horse boat," the dead animals on deck, and the offal and garbage in uncovered tubs or boxes. The boat generally reaches the island about 10 A. M., the load is taken to the second floor, the "cutting up room," where the animals are skinned, cut up and with the offal put into the iron tanks, closed hermetically and then boiled. Each tank is fitted with escape flues, running to a conduit which carries the fumes to a condenser, and from the latter the remaining fumes are taken under the boiler fires and there consumed. The wet scrap after boiling is put into patent dryers and in a few hours is perfectly dry and ready to be spread on the floors to cool. The garbage is put into wooden vats fitted with covers and wooden flues connecting with a conduit, which has an exhaust-fan so that the fumes may be carried to a condenser. After cooking the swill is taken by tram-car to the pig-pens. The fat rendered in the kettles is taken to the oil-house in the rear of the rendering works and then compressed for its oil, the stearine being barreled and the oil prepared for market. No fumes are created in this part of the works.

The rendering works has been enlarged by the addition of four more kettles, in order that all matter received could be handled on the same day. Formerly scrap was dried on platforms, but

the use of patent dryers rendered the slower process unnecessary and did away with the keeping of wet scrap from which more or less odor always came. As soon as the dead animals are cut up the floor is washed down, the hides washed and salted and all evidence of the work removed. The board made several recommendations concerning this factory and all were promptly carried out by the owners.

The pig-pens contain over 500 pigs. The sties are kept clean, and to insure further cleanliness the old wooden troughs are being replaced by iron.

THE BARREN ISLAND GUANO COMPANY.

Fish are here handled in the same manner as at Sternfel's, and the factory is in about the same condition. The description of one supplies for both. Nothing is done to render any nuisance created less, or to abate it.

The petition received from the Rockaway Park Improvement Company, the testimony adduced by their counsel, as well as his brief, all point to but one complete remedy for the abatement of the alleged nuisances, namely: The removal from Barren island of the various manufactories there situated. It is conceded that more or less nuisance is made by these factories. It is not conceded, however, that the nuisance is such as to be carried the distance claimed, from four to six miles, as appliances are being used by the manufacturers to minimize the effluvia, and some of the works stopped during part of the year, the nuisance is not so great as stated by the petitioners.

All of the factories belong to that class known as offensive industries, of the kind usually driven out of the cities or villages on account of the nuisance they become to the inhabitants. When the factories first started on Barren island there were but few houses in the neighborhood which could be inconvenienced by the smells, and no care was taken to prevent the creation of a nuisance, but as persons began to settle along the seaboard it became necessary for the manufacturers to prevent being closed out of their business to take measures to control the odors arising from their works, and from time to time more or less has been done.

The population growing meanwhile, about seven or eight years ago, the State Board of Health was appealed to and made certain recommendations for the better care of the effluvia which some

of the industries followed out. At the superphosphate works, owing to the pungency of the odors arising from the mixing of the various ingredients, flues and condensers were put in, and Mr. Coe made arrangements whereby he would not run the factories during the three summer months in order to lessen, what he evidently considered, was an annoyance to the Manhattan Beach Hotel. Consultation of authorities upon such matters goes to show that with proper exhaust fans, flues, conduits and condensers, the nuisance made by the superphosphate works can be so controlled as not to give annoyance or discomfort beyond the works themselves. These conduits and flues and the sheds where the product is stored must, however, be carefully looked after and kept in proper working order. If this is done and Mr. Coe continues not to manufacture during the summer months, the State Board sees no reason why the works should be disposed of.

As has already been stated, at Mr. White's rendering establishment all the dead animals and offal from the city of New York are handled. During the year 1889, the following table shows the number of dead animals, offal, and so forth, removed by the contractor from the city.

The number of dead animals removed from the streets, and the quantity of offal, etc., removed from the markets and slaughter-houses by the contractor during the year 1889, was:

Number of horses	6,942
Number of colts	31
Number of donkeys and mules	10
Number of steers	84
Number of cows	103
Number of calves	2,462
Number of bulls	1
Number of sheep	699
Number of deer	3
Number of hogs and pigs	26
Number of dogs from pound	6,660
Number of cats and dogs from streets	23,765
Number of goats	171
Number of bears	1
Number of alligators	1
Number of kits of pigs feet	103
Barrels of poultry	461
Barrels of fish	3,434

Boxes of fish	367
Pounds of fish	184,000
Boxes of offal	13,945
Boxes of cheese	617
Pounds of cheese and sardines	2,000
Barrels of rabbits	125
Barrels of game	3
Cases of tenderloins	50
Pounds of canned goods	300
Quarters of beef	523
Quarters of veal	3,291
Quarters of mutton	791
Pounds of ham	740
Pounds of fruit and vegetables	10,000

It is apparently conceded that there is no nuisance proceeding from these works, except at the time of the cutting up of the cargo which is received every morning from the horse boat. This may be removed by the carrying of conduits from the roof of the cutting up room, the conduits being supplied with exhaust fans and the air from the conduits as driven by the fans either passed under the furnaces or through condensers or over some disinfectant, and disinfectants should also be used in the room during the hours the material is being prepared for the kettles. This would create an inflow of air into the cutting up room and instead of allowing the odors of the dead animals or offal to mingle with the outside air it would prevent their escape and do away with what is considered the only cause of complaint now existing against these works.

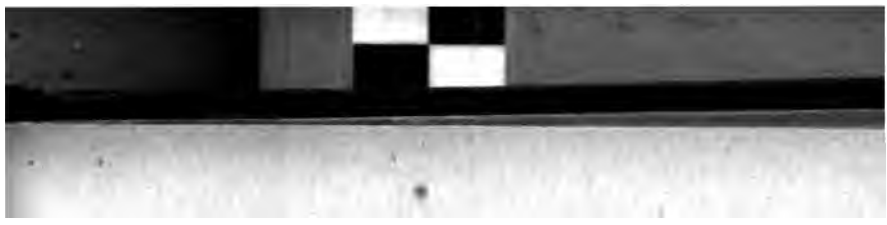
In regard to the fish factories, which do not run in winter, it is claimed that the odor made by the cooking is evanescent and not carried to any distance. The State Board can not agree with the latter statement. The cooking of oily fish, though fresh, in open kettles makes a grease-laden steam offensive to many, which mingles with the air and adds its quota to the general effluvia of the island. The Board, at its former visit, recommended that the cooking be done in a closed vat. There is no reason why this should not be enforced and the fumes carried to a condenser or underneath the furnace fires in order to be consumed. It is claimed that the fish can not be cooked in iron kettles. It is not

necessary that the wooden should be changed for metal, for wooden hoods or covers can be made over the kettles connecting with wooden tubes to a wooden conduit above, the latter fitted with an exhaust fan, so that all the fumes from the kettles can be controlled and carried away.

More care should be shown in keeping the places cleaner; much nuisance of decaying particles of scrap would be avoided if so much was not allowed to lay around the place. It appears, from all the State board can gather, that there is no way by which the fish scrap can be properly dried except upon platforms by the action of the sun. It is stated that patent dryers, while excellent for meat scrap, scorch or burn up the fish scrap, it being lighter in substance. It is also stated by those having experience in the business that the fish scrap spread upon the platforms does not create a smell if properly cared for and there is not more upon the platforms than they can carry. If, however, the fish scrap has to be put in piles awaiting its turn for spreading it is liable to decay, the inside of the pile heating, and when open, giving off offensive odors.

It appears, from the evidence, that one or two inspectors in private pay have been upon the island during the summer months for the past two or three years. It is understood that these inspectors were to see that the manufacturers carried out such recommendations as have been made by the State Board of Health, and in other ways to generally supervise the nuisance question. But it does not appear from where these inspectors receive authority to enforce any order or suggestion they might make. The board is in doubt as to what power they did have, and certainly can see no particular good that they did.

In order to secure strict conformity to the requirements of stench-producing industries on the part of the manufacturers and to carry out faithfully all the rules or suggestions made by this board, it is advised that the board appoint an inspector whose duty it shall be to visit the island two or three times per week, or as much oftener as may be considered necessary at unexpected times, and that he report to the board any violation of sanitary rules. That he have the power to direct the immediate suspension of any one of the various industries which may neglect to carry out the provisions for the protection of the people from the odors arising therefrom, reporting the same to the board at once



and that his salary be paid by the various manufactories upon the island.

The State Board, in submitting its report, has thought best not to burden it with quotations from authors upon stench-producing industries, or to waste time upon more minute descriptions of the island itself. In forming its opinion and making its recommendations as to the manufactories on Barren island, it has been guided by the knowledge acquired on personal inspection of many of its members, by the reports of its inspector made from time to time during several years, as well as by the evidence adduced. To have been guided alone by the latter would have been to place the board in such a position as to make the rendering of a decision an impossibility. The statements of all have been given consideration; the annoyance caused inhabitants near to the island by the effluvia coming therefrom; the fact that, notwithstanding this, the number settling in the vicinity has steadily increased; taking all these into consideration, the board feels that its recommendations are just and based on sound principles.

RECOMMENDATIONS.

First. That the conduits, exhaust fans and condensers at the super-phosphate works of Mr. E. Frank Coe, be kept in proper running order and used whenever manufacturing; that the same recommendations be made about the conduits and fans drawing the air from the storage sheds of the manufactured fertilizer and that the side boarding of these sheds be kept tight and in condition.

Second. That, at Mr. White's rendering establishment conduits with an exhaust fan be run from the upper portion of the cutting-up room and the air therefrom pass either over or through disinfectants or be carried under the furnace fires for destruction. That disinfectants be exposed in the cutting-up room.

Third. That, at the fish factories both at Mr. Sternfels and the Barren Island Guano Company the fish be boiled in covered kettles, having flues, exhaust fans and condensers and that no more fish be received in one day than can be properly handled and dried upon the platforms. That flues and exhaust fans be fitted to the shed where the wet scrap is placed when the weather does not permit of its being dried upon the platforms and the fumes from the shed be condensed or destroyed under the furnace fires.



Fourth. That, the State Board of Health appoint an inspector who will report to it any violation of sanitary rules and regulations by the various factories upon the island; that he shall visit the island not less than twice a week and as much oftener as may be necessary; that his salary shall be fixed by the State Board of Health and paid by the various manufacturers concerned.

If these recommendations are enforced the petitioners will be relieved of the nuisances they now complain of.

Respectfully submitted.

THOMAS NEWBOLD,
President.

LEWIS BALCH, M. D.,
Secretary.



APPENDICES.

In the Matter of the Barren Island Nuisances.

Hearing Before Committee of the State Board of Health, November 6, 1890.





TESTIMONY.

IN THE MATTER OF THE INVESTIGATION OF BARREN ISLAND.

Meeting of the committee of the State Board of Health at the Everett House, November 6, 1890.

Present.— Dr. Florence O. Donohue, Dr. Lewis Balch, secretary.

Appearances: Mr. William J. Kelly appeared for the petitioners; Mr. William P. Prentice, Mr. John Frankenheimer, Mr. Arrowsmith, Senator Cantor appeared for the defendants.

Secretary Balch stated the objects of the meeting and read the order of the Governor directing the State Board of Health to make the investigation. He also read the petition from the Rockaway Park Improvement Company, and requested the plaintiffs to present evidence on this question first; the forms observed in court would be adhered to, and after the testimony was all in counsel on both sides could either sum up or submit briefs.

Mr. KELLY.— I do not think there is anything necessary to add to the petition which the chairman of the committee has read in the way of opening the case for the complainants against the Barren island factories, and without delaying you any further I will proceed to present the evidence, which, I think, is sufficient to substantiate the charges made against the factories.

EDWARD J. BOYLE, being duly sworn, testified as follows:

Q. What is your full name?

A. Edward J. Boyle.

Q. Where do you live, Mr. Boyle?

A. Six hundred and sixty-eight Dean street, Brooklyn.

Q. Are you familiar with the location of Barren island?

A. Yes, sir.

Q. Have you visited Barren island during the past summer?

A. Yes, sir.

Q. How often?

A. Most every day.

Q. During the year 1889 did you visit it within the summer?

A. Yes, sir.

Q. How often?

A. Nearly every day.

Q. Did you visit it in 1888?

A. Yes, sir.

Q. Commencing at what month of the year did your visits begin?

A. From July, 1888, and continued down to the first of September; in 1889 and 1890 I began in June and continued to the first of October.

Q. You went down by the request of the Manhattan Beach Hotel?

A. Yes, sir.

Q. Are you familiar with the business carried on on Barren island?

A. Yes, sir.

Q. How many factories are there on Barren island?

A. Five factories.

Q. Who conducts them?

A. Mr. White, Andrew J. White and Thomas F. White conduct the horse factory.

Q. Who else?

A. Mr. E. Frank Coe, he keeps the fertilizer factory.

Q. Who else?

A. Mr. Goodkind and Mr. Sternfeld.

Q. Mr. Goodkind has what sort of a factory?

A. A fish factory.

Q. Who else is there?

A. Mr. Hagaard, manager of the Barren Island Guano Company and fish factory.

Q. This island, Barren island, runs in what direction; what is the length?

A. It is about a mile.

Q. Does it run from east to west; is that the general direction of the island?

A. It runs east and west.

Q. Which factory is nearest Coney Island?

A. Mr. Coe's.

Q. Next to that is?

A. The fish factory.

Q. Mr. White's factory is located?

A. About the middle of the island.

Q. Nearest Rockaway and opposite Rockaway, apparently the east end?



A. Yes, sir.

Q. What business is carried on in Mr. White's horse factory?

A. He takes horses and garbage over from New York; he takes them down on a steamboat.

Q. That is the dead animals collected here in New York?

A. Yes, sir.

Q. All kinds of animals?

A. Yes, sir.

Q. They are brought to Barren island on boats?

A. Yes, sir.

Q. Is there a dock at Mr. White's factory?

A. Yes, sir.

Q. Describe the operation from the time the boat comes to the dock and how the animals are taken from the boat?

A. They are hoisted up to the second floor of the factory by a derrick.

Q. What is done with the offal?

A. It is hoisted up in the same way; it is brought in boxes; they are not covered; they are hoisted up and brought in on the second floor.

Q. How about the garbage?

A. That is brought in the same way in boxes.

Q. Are they covered?

A. No, sir.

Q. The garbage is brought in on the second floor?

A. Yes, sir.

Q. The second floor of the horse factory is how large?

A. I guess it must be about seventy-five feet long and about thirty or forty feet wide.

Q. These dead animals are horses, cows, dogs, etc.?

A. Yes, sir.

Q. What is done with them when they are brought into this second floor?

A. They cut them all up.

Q. Do they remove the hide?

A. Yes, sir; and disembowel the dead animals and take out the entrails.

Q. What is done with the meat?

A. It is put into tanks; it is chopped in pieces of about two feet and put into tanks.

Q. Is the offal and garbage put into tanks?

A. Yes, sir.

Q. This room where the cutting is done, how is it lighted?

A. By doors in front; it is all open in front.

Q. How about the ceiling?

A. It is of lattice open work on top.

Q. You have been there I suppose during the process of cutting up these animals?

A. Yes, sir.

Q. What can you say about the odor, if anything, at that time?

A. It is very strong, indeed.

Q. How about the odor from the animals before they are cut up?

A. That is pretty strong, too.

Q. In the summer time have you ever noticed this odor at any distance from Barren island?

A. Yes, sir.

Q. How far away have you noticed the odor of dead animals?

A. I have noticed it at Canarsie.

Q. These pieces of the animals when cut up are put into tanks?

A. Yes, sir; to boil.

Q. What for?

A. To extract the oil.

Q. What is done with the garbage and offal?

A. That is boiled in the same way.

Q. I want to call your attention to the vats the garbage is boiled in; what are they made of?

A. They are made of wood.

Q. Have you ever been there during the process of boiling?

A. Yes, sir.

Q. What can you say as to the escape of steam or vapor from the vats in which the garbage is boiled — is there any vapor from it?

A. Yes, sir; the steam comes from it and it is offensive.

Q. The dead animals and offal are placed in iron tanks?

A. Yes, sir.

Q. Fitted with condensers?

A. Yes, sir.

Q. They also have hog-pens at Mr. White's place?

A. Yes, sir.

Q. Mr. Boyle, passing to the fish factory next to Mr. White's, who operates that?

A. Mr. Sternfeld.

Q. Is the method pursued at the different fish factories the same?

A. Yes, sir.

Q. How are the fish factories worked — what is the first thing done



A. The fish comes there in boats and they are hoisted up in iron buckets, dumped right into the railroad cars and thence into the tanks.

Q. They put them into tanks or vats — what are they made of?

A. Wood.

Q. How is the fish treated in the vats?

A. They are boiled there.

Q. Are the vats covered?

A. No, sir.

Q. During the process of boiling is anything done with the fish?

A. They stir it up continually.

Q. Is there vapor or steam arising from the open vats?

A. Yes, sir.

Q. What is its character?

A. It is pretty strong, when they are boiling.

Q. Would it affect the stomach?

A. I should say it would.

Q. You became somewhat familiar with these smells in three years?

A. Yes, sir.

Q. After the fish is treated in the vats what is done with it?

A. It is taken out and spread on platforms.

Q. How large are they?

A. I suppose about 200 feet long.

Q. The fish is taken from the vats and spread out there?

A. Yes, sir.

Q. You have been there during the past summer?

A. Yes, sir.

Q. How long has it been allowed to remain on the platform — the fish?

A. Forty-eight hours.

Q. What is the effect of the hot sun on this fish during the hot weather?

A. It causes it to turn to maggots and rot.

Q. Is there a bad smell from those platforms?

A. Yes, sir.

Q. Have you detected that smell at a distance from the island?

A. Not the fish for the same distance as the other; I should say for a distance of 1,000 feet.

Q. I understand you to say all the fish rots there?

A. No, sir; it don't all rot; some of it does; if it lays long and gets wet and the next day is warm it rots.

Q. How long have these vats in the fish factories been open — ever since you went there?

A. Yes, sir.

Q. Did you ever call attention to the fact that they were uncovered?

A. Yes, sir.

Q. Have you spoken to them about it?

A. Yes, sir.

Q. How long ago was it that you first spoke to them about it?

A. Two years ago.

Q. And nothing has been done about it?

A. No, sir.

Q. Have you spoken about leaving the fish exposed for any length of time?

A. Yes, sir.

Q. And did they still continue to do it?

A. Yes, sir.

Q. When I have been questioning you about these fish factories I assumed that one is conducted in the same manner as the other; is that so?

A. Yes, sir.

Q. Open vats in both and methods the same?

A. Yes, sir.

Q. What do they do in Mr. Coe's factory?

A. They manufacture fertilizer material.

Q. What is the product of the manufacture — what sort of stuff is it?

A. Phosphate and ammoniated bone mixed with fish scrap and dried blood.

Q. Dried blood; where did they get it?

A. I don't know where they get the blood from.

Q. And the fish scrap?

A. They get some from Mr. Sternfeld's and some down in Jersey.

Q. Do they mix this in any acid?

A. Yes, sir.

Q. What?

A. Sludge acid.

Q. What is the effect of that mixture?

A. It smells strong.

Q. Could you detect that smell at a distance?

A. Yes, sir.

Q. How far have you noticed that smell?

A. About a mile off.

Q. Is this factory of Mr. Coe's open on the sides?



A. Yes, sir.

Q. Open windows?

A. Yes, sir.

Q. How much phosphate or fertilizer material did you see?

A. I could not tell.

Q. Was there a room full?

A. Oh yes, sir; there was a large quantity.

Q. Then you think the smell of that can be detected for a mile?

A. Yes, sir.

Q. You have made reports, I believe, on Barren island for the last two years?

A. Yes, sir.

Q. How many dead animals are brought to Barren island?

A. About fifteen per day on the average; sometimes thirty or forty, and some days less than that.

Q. How many boxes of offal?

A. About forty-five, fifty or sixty a day.

Q. And garbage?

A. Twenty on the average.

Q. Can you give any idea how much fish is brought to the island; how many boat-loads per day?

A. Some days three or four, some two.

Q. How many of these large platforms are there at the fish factories?

A. Sternfeld's two, the other factories two; two each.

Q. During the hot weather in the summer are those platforms there all covered with fish?

A. Yes, sir.

Q. Every day?

A. No, sir; three times a week on the average.

By Mr. WHITAKER:

Q. You say you can't smell the odor from these fish factories for more than 1,000 feet?

A. That is the furthest I have smelled it.

Q. Do you think you could smell it for a mile if you were to leeward of it?

A. I smelt it as I was approaching the island.

Q. Do you think you could smell it for more than 1,000 feet if to leeward of it?

A. I might.

Q. Is your sense of smell good?

A. Yes, sir.

Cross-examination:

By Mr. FRANKENHEIMER.

Q. Mr. Boyle, in what condition are the fish when they arrive in the boats; are they dead or alive?

A. They are dead, and some of them alive.

Q. Are they mostly alive?

A. Not all that arrive; I have seen them arrive alive.

Q. You were there yesterday?

A. Yes, sir.

Q. Did you see the boat load arrive there yesterday?

A. No, sir.

Q. Do you know whether they mix in anything in boiling the fish?

A. No, sir; I never saw them mix anything.

Q. All they do is to boil the fish in hot water?

A. Yes, sir.

Q. Then, the smell that comes from it is the smell of boiling fish?

A. Yes, sir.

Q. Do you say that that smell makes you sick?

A. It did not make me sick.

Q. I understood you to say it did?

A. No, sir.

Q. Then as to the scrap, the fish-scrap, when it is spread out to dry, have you ever smelt that?

A. Yes, sir.

Q. Has it made you sick?

A. No, sir.

Q. Have you ever been in the warehouse in which they keep the dry scrap?

A. Yes, sir.

Q. Have you smelt it then?

A. Yes, sir.

Q. Do you call it an offensive odor?

A. No, sir; not the dry scrap.

Q. How long have you been down there?

A. Three years, three summers.

Q. Were you familiar with the island before that?

A. No, sir.

Q. Do you know anything about the system of catching the fish; how they are caught?

A. They are caught by nets; boats are sent out.

Q. They are all steamers?

A. Mostly.

Q. And when they get a load they come back to the dock and unload?

A. Yes, sir.

Q. Have you not been informed down there that those steamers as a rule come in with one day's fishing?

A. Yes, sir.

Q. It is generally a fresh haul?

A. Yes, sir.

(Admitted that the fish are fresh when brought to the place.)

Q. I understood you to say the fish are taken from the boat, hoisted up and emptied into a car?

A. Yes, sir.

Q. And then are at once emptied into the tanks?

A. Yes, sir.

Q. So that the fish are at once boiled?

A. Yes, sir.

Q. None of them are left on the platform to rot?

A. No, sir.

Q. What is your business?

A. I am an agent.

Q. For whom?

A. Collecting rents.

Q. In whose employ are you on the island?

A. I was employed by the Manhattan Beach Company.

Q. You have been in their employ how long?

A. Three years.

By Mr. WHITAKER:

Q. These vessels go out to catch this fish?

A. Yes, sir.

Q. And they are gone sometimes three or four days?

A. Yes, sir.

Q. And sometimes a week — starting Monday morning they might catch a haul of a few, put them in the hold, they would not bring them home then?

A. No, sir.

Q. Suppose they were at Montauk Point and made a haul of some thousand, they would put them in the hold and wait to get another haul, and might be two or three days in getting back?

A. But they get them right here.

Q. But sometimes they might have them four or five days?

A. Sometimes.

Q. They are not perfectly fresh in such a case when taken home?
A. No, sir.
Q. They would be decayed?
A. Yes, sir.
Q. As a matter of fact these vessels arrive with decayed fish?
A. Very seldom.

Cross-examination continued:

Q. Have you gone with any of these vessels to see how long they stayed away?
A. No, sir.
Q. All you testified to now on that subject is mere hearsay?
A. Yes, sir.
Q. You do not know of your own knowledge how long they stay away?
A. No, sir.
Q. You know their trips in summer are much shorter than in the fall?
A. Yes, sir.
Q. You know the fish are caught in the bay?
A. Yes, sir.
Q. Have you not seen boats come in every day?
A. Yes, sir; and twice a day.
Q. You know all the boats that belong to these fish factories?
A. Yes, sir.
Q. You can tell them apart?
A. Yes, sir.
Q. You have seen them come in every day?
A. Yes, sir.

By Mr. WHITAKER:

Q. How far could you smell a lot of rotten fish?
A. I suppose about half a mile anyway?

By Mr. KELLY:

Q. Mr. Frankenheimer referred to the fact that you were on Barren island yesterday?
A. Yes, sir.
Q. You were at the fish factories?
A. Yes, sir.
Q. How did the general condition of the fish factories yesterday compare with the condition of the same factories during the summer?
A. It was better yesterday.

Q. Did you notice a slight improvement?
A. Yes, sir.

By Dr. BALCH:

Q. Are all the fish taken in the waters around the sound, or do they get fish from anywhere else?
A. Not that I know of.

By Mr. CARVER:

Q. What is your actual employment during the summer months, when you make these daily trips to Barren island?
A. Inspector.
Q. You were employed by the Manhattan Beach Hotel?
A. Yes, sir.
Q. To go over to Barren island every day, look around and make reports?
A. Yes, sir; that has been my employment for three years.
Q. Are you employed by them during the winter months?
A. No, sir.
Q. You are collector of odors in the summer time and of rents in the winter time?

PETER P. SHARKEY, being duly sworn, testified as follows:

Q. Where do you live now?
A. In Flushing.
Q. What is your business?
A. A commission merchant in New York.
Q. During the summer months have you been on Rockaway park?
A. I own a house on Rockaway park.
Q. Do you know where Barren island is—about how far from your house?
A. It is two miles, as the crow flies.
Q. Tell the State Board of Health what your experience has been with smells?
A. When the wind is from the west, from Barren island, the smell is exceedingly pungent, it causes nausea and headache; the female members of my family, especially, it makes them sick; I remember one night in the early part of August, every member of my family was waked up by the smell; I remember one time I induced friends of mine to go down to Rockaway park to invest in land; they went down on Saturday noon, and the wind was in a southerly quarter; I went down too and went away also—

(Counsel for defendants objected to the line of evidence.)

Witness continued: I found the smell when I got down to be pretty strong.

Q. Are all the smells alike or are there varieties of smells there?

A. I have never been on Barren island.

Q. Was there more than one kind of smell?

A. I have been under the impression there are two.

Q. Did you say that sometimes it is strong enough to create headache and sickness?

A. Yes, sir; sometimes.

Cross-examination:

Q. How long have you lived down there?

A. This summer was the first; I lived down in Rockaway Beach, three or four years ago.

Q. For how many years?

A. Simply during the summer.

Q. You can describe these smells to the Board of Health, the difference between the two?

A. The most prominent form of the smell is that it is pungent.

Q. You can not tell from what it emanates?

A. No, sir.

Q. All you know about it is that it has a bad odor?

A. Yes, sir; I only smelt it once, the one I especially alluded to.

Q. The two occasions you referred to were the only occasions when the smells were offensive?

A. No, sir; it is offensive when the wind is in the west; I live in Rockaway Beach from June to October; I was there over night; I own a house there.

Q. You knew Barren island was pretty close to you when you purchased the house?

(Objected to as irrelevant.)

A. Yes, sir.

Q. You knew the character of the business conducted there?

A. By repute.

Q. You lived at Rockaway?

A. I stayed there in the summer; I found offensive odors occasionally during the summer.

Q. But you did not think that was enough to influence you in purchasing a house?

A. I think there are other influences stronger.

Q. Rockaway park is located on the Atlantic ocean and Jamaica bay behind?



A. Yes, sir.

Q. Within half an hour's ride of New York and Brooklyn?

A. Yes, sir.

Q. And that's what brought you down? You would not imperil your health and that of your family?

A. I do not think the smell imperils our health.

JOHN F. HUME, being duly sworn, testified as follows:

Q. Where do you reside?

A. At Poughkeepsie, New York.

Q. You are in business in New York city?

A. Yes, sir.

Q. Do you know where Barren island is?

A. I do.

Q. Have you been in the vicinity at any time?

A. Yes, sir, somewhat recently; I have been down to Bergen island which is in that neighborhood, not far from Canarsie.

Q. How far from Barren island is Bergen island?

A. I suppose two and a half or three miles, probably about three miles.

Q. Have you been at Bergen island on any occasion when the wind was blowing in the direction from Barren island?

A. Yes, sir; I inferred it because I got some of these odors.

Q. What was the nature of the odors brought on the wind?

A. They reminded me of the odor I got right along when riding on the Long Island railroad when passing heaps of manure; it was suggestive of that.

Q. Was it offensive?

A. It was not very pleasant.

Q. How long were you at Bergen island on that occasion?

A. I was there perhaps an hour.

Q. During that time were these odors perceptible?

A. Occasionally; they seemed to come in whiffs; I would not realize them all the time, but now and then I would get a nostril full. I have been there three times; I have more or less to do with selling real estate; two acquaintances of mine from Ohio had been speculating in real estate in Cincinnati; they came along to look up property in the vicinity of New York.

(Objected to as incompetent.)

Q. Did they buy Bergen island?

A. Yes, sir.

Q. Have they endeavored to sell it?

A. Yes, sir; they have been making some efforts in that direction.

Q. Do you know of any purchaser going down there?

A. I took one down.

Q. What was the experience?

A. It was not satisfactory; before, when we went down, they did not smell the odors, but when I got a customer unfortunately we did; the sale did not work.

Q. Can you give any information as to the character of the odor?

A. It is hard to describe; as I said, it reminded me of manure heaps that are scattered along Long Island railway stations.

Cross-examination:

Q. You are a real estate dealer?

A. Yes, sir.

Q. In New York city?

A. Yes, sir.

Q. You have had business relations with the Manhattan Beach people?

A. No, sir.

Q. With the Rockaway Improvement people?

A. No, sir; I have had business relations with Mr. Sherwood, who is receiver for in connection with the Manhattan Beach; I deal in securities.

Q. Is Bergen island large or small?

A. Three hundred acres is embraced in the property.

Q. You sold this to the Ohio syndicate?

A. Yes, sir; they signed the contract and paid one installment.

Q. What months were they down there inspecting the island before signing the contract?

A. It must have been in September.

Q. How many times were they down there before signing the contract?

A. They went down twice with me and once by themselves.

Q. The times you were down there, there was no offensive odor reaching you at all?

A. No, sir.

Q. The Ohio people did not complete their purchase?

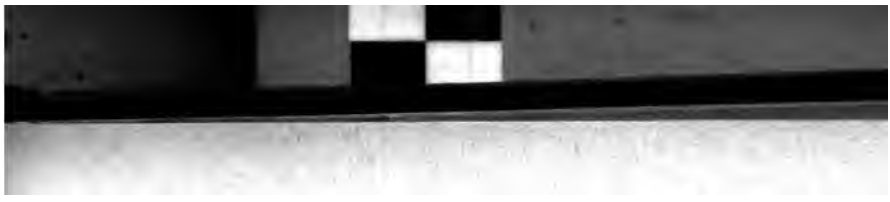
A. They signed the contract and paid one installment.

Q. You were trying to sell it?

A. I was trying to get a party in real estate to go in with them.

Q. He went down there?

A. Once only that I know of; the smell was there.



Q. That was the only reason that prevented them from purchasing?

A. That was one reason, but not the only one.

Q. The question of price?

A. The question of price was not discussed then.

Q. The question of odor was an incident?

A. Yes, sir; it was one of the things; these people have been down since, but I was not with them; negotiations still go on, but they are in something of a dilemma.

CHARLES H. SHELLEY, being duly sworn, testified as follows:

Q. What is your business?

A. A hotel-keeper.

Q. During the past four or five years have you been to Coney Island during the summer time?

A. Yes, sir; for seven seasons in charge of the Oriental Hotel, on Manhattan Beach, the eastern extremity.

Q. Do you know where Barren island is?

A. Yes, sir.

Q. Can you give the committee any information as to the smells which come from Barren island to Manhattan Beach.

A. Yes, sir.

Q. State your experience, going back two or three years?

A. It has been a repetition of unpleasant odors and smells during the months of July and August and at times in September, to the discomfort of the guests; many of them have threatened to leave in consequence; the smells are noticed when the wind is from Barren island; only at that time.

Q. Are there a variety of them there?

A. I am of opinion that there are two kinds.

Q. What is the difference?

A. One is a pungent, nauseating odor that has created illness in some of the families there, to the extent of nauseating stomachs; the other is pretty hard to describe; it is very offensive; I have seen all the ladies on the piazza of an evening leave us in consequence.

Q. Have you noticed any increase in this smell when the weather is heavy and hot?

A. Yes, sir; very marked then.

By Mr. WHITAKER:

Q. What makes you think this smell comes from Barren island?

A. From the reports I have heard from there; I have never been close to the island, other than Manhattan Beach; I am positive it is from Barren island.

Cross-examination:

Q. You say you have been down there seven years in charge of the Oriental Hotel?

A. Yes, sir.

Q. It was built in 1880?

A. The Manhattan Beach Hotel was opened in 1877.

Q. The Oriental is entirely devoted to private families?

A. And to transient business; it is conducted on the American plan.

Q. You intend it to be a very high-priced hotel?

A. We try to make it so.

Q. Manhattan Beach Hotel is open to the general public; they also take guests in the Manhattan Beach Hotel?

A. Yes, sir.

Q. During the seven years you were there have you noticed any difference in the smells?

A. At times more so than at others.

Q. During every season there was trouble about the smell?

A. Yes, sir; one special season it was fearful, namely, in 1886; the majority of the leading families agreed to sign a petition to attempt to stop it in some way.

Q. You have also noticed smell there?

A. Yes, sir.

Q. There has not been any decided falling off in the number of excursionists coming down?

A. I don't know anything about that.

Q. There has been some falling off in the Oriental Hotel business because of its proximity to Manhattan Beach?

A. That has never been an objection to the guests of the house.

Q. You have always had about the same number of guests?

A. For the last two or three years the number of guests has been decreasing.

Q. And that is true of the other hotels?

A. I do not know about that.

Q. The best guests come to your place?

A. Yes, sir.

Q. Have you not had some guests during the last year that were there the year before or prior years?

A. Yes, sir; we have had guests that have never missed a season but one and still are strenuous objectors.

Q. And you question whether some have not discontinued their visits because of this odor?

A. Yes, sir.



Q. Have they told you so?

A. They did not tell me that, but I attribute their failure to come to that, although I have no positive proof.

Q. The smells of last year were as offensive as this year?

A. Not as much so.

Q. In 1890 they were not as offensive as last year?

A. They were not as often, but they were offensive when we had them.

By Mr. PRENTICE:

Q. What direction does the Oriental Hotel lie from Barren island?

A. Westward.

Q. Did you notice with what wind you got the odor?

A. Northeast and southeast.

Q. You remember any month this year when the wind was easterly?

A. I do; we had a great number.

Q. Is it not true that during all these seasons easterly winds have prevailed throughout the country?

A. I could not say that.

JOHN M. WILLIAMSON, being duly sworn, testified as follows:

Q. Where do you live?

A. At Ozone park.

Q. What is your business?

A. Superintendent of the Park Improvement Company.

Q. Do you know where Rockaway park is? And where Barren island is?

A. Yes, sir.

Q. How large is Rockaway park?

A. It consists of 140 acres, running from the Atlantic ocean to Jamaica bay.

Q. How far from Barren island is Rockaway park?

A. About two miles and a quarter.

Q. When did you first go down to Rockaway park in the employment of the Rockaway Park Improvement Company?

A. On the 14th of July, 1889.

Q. You had been familiar with that country for a long time?

A. Somewhat.

Q. Since you have been in the employment of the park company how often have you been there?

A. I have been there every day, with the exception of Christmas and New Year.

Q. I wish you to state to the committee whether there are any smells noticeable at Rockaway park and when you noticed them?

A. On what days?

Q. Generally.

A. There are very offensive smells, no doubt; we get them there when we have a westerly wind; the wind a little to the northwest.

Q. Have you heard people complain of them?

A. Oh, a great many.

Q. How often during the past summer have you noticed these smells?

A. We have not been annoyed as much this past summer as we were a year ago this summer, although we have had them.

Q. How many times a week do you suppose?

A. Whenever the wind is from the west.

Q. For half of it?

A. Sometimes; every day it smells if there is a westerly wind?

Q. Have you ever done anything towards tracing the smells to their sources?

A. I have smelt the odor and taken a boat and gone down to Barren island to ascertain from which factory it came, whether from the fish factory or the fertilizer factory; that was in the summer of 1889.

Q. Who was with you?

A. Different parties.

Q. How many times did you do that?

A. At least five different times, possibly more.

Q. Where did you trace the smell, to what factory?

A. Sometimes the horse factory, sometimes the fish factory and sometimes the fertilizer factory.

Q. What is the smell from the horse factory, what occasions it?

A. It seems to be occasioned by the smell from decayed animal matter; it is a very offensive smell, sickening and nauseating.

Q. You followed it up to Barren island?

A Yes, sir.

Q. Where?

A. To the horse factory.

Q. Did you attempt to get in?

A. Yes, sir; I did not the first two or three times I went down; a party met me on the dock and wanted to know my business; I could not answer satisfactorily, any more than that I wanted to go through the factory; he informed me there was no admittance; I finally got into the factory and noticed the source of the smell; it seems to come from all branches; from the time the stuff was brought there until it was



put into the vats; I was there during the process of cutting up the animals. I found it very offensive.

Q. Can that smell from cutting up the animals be detected at Rockaway Beach?

A. Yes, sir.

Q. No mistake about it?

A. No, sir.

Q. Following it up till after they got it into the vats, did you notice any smell from it then?

A. Yes, sir; there is a smell continually around the factory.

Q. You mean from the time it is inclosed in the tanks?

A. Yes, sir; you can detect the odor from the factory at any time; I should judge, being to leeward of the factory, you could smell the odor a quarter of a mile at any time, whether they were cutting up or putting them into tanks, or whether they were boiling.

Q. When they were not boiling, how about that?

A. I think I smelt it the same; the place is impregnated with the smell, to the best of my knowledge and belief.

Q. What did you find at the fish factory?

A. I found them in the course of drying them out, boiling them, unloading fish from boats, putting them in tanks and boiling them; the dry scrap was spread on platforms.

Q. What was the source of the bad smell?

A. Most of it originated from the drying of the scrap on the platform.

Q. Did you examine any of it to see its condition?

A. It was not necessary to examine it, I could see it; it seemed to be decayed boiled fish; it had lain there and was full of maggots; it lay there in heaps; the scrap is spread out on platforms and dried in the sun; the stench was very offensive.

Q. Did you see them boiling fish there in open wooden vats?

A. Yes, sir.

Q. Was there a vapor?

A. The smell was very offensive, indeed, a smell like boiling decayed fish.

Q. They do not clean the fish before putting them in the vats?

A. I didn't see that.

Q. You traced a smell to Coe's fertilizer factory?

A. Yes, sir.

Q. What did you find as the source of the smell there?

A. I did not go ashore at Coe's factory.

Q. Was the smell too strong?

A. Yes, sir; it was a little bit too rich for me; I could not stand it; I traced the smell to the vicinity of Coe's factory; I found it did not originate from either the horse or the other factory.

Q. This Rockaway park is divided into lots with cottages erected thereon and sold to different people?

A. Yes, sir; that is the object of the company.

Cross-examination:

By Mr. CASTOR:

Q. How many distinct kinds of smell were there?

A. Three.

Q. When you discovered a smell you got into a row-boat or took a sail-boat and if there was no wind you took a row-boat—you had a boat ready to follow up the smell?

A. We always had it ready; we discovered the smell, got into the boat and followed it up.

Q. It was a smell from one of the factories reaching along to where you stood?

A. Yes, sir.

Q. You followed it along?

A. Yes, sir; I went to the island in search of it.

Q. Till you got to the place you supposed it originated at?

A. Yes, sir.

Q. How many times did you follow the smell to the horse factory?

A. I have no memorandum; I do not know now, but I will say twice.

Q. Covering a period of how long?

A. About two weeks.

Q. You have been down there at Rockaway park for two years?

A. Yes, sir.

Q. And you followed these smells up twice only?

A. To the horse factory.

Q. Under whose instructions?

A. Under the instructions of my employer.

Q. What time of day was it when you followed up those smells?

A. I could not say positively; it might have been just before or just after dinner; it was about noon.

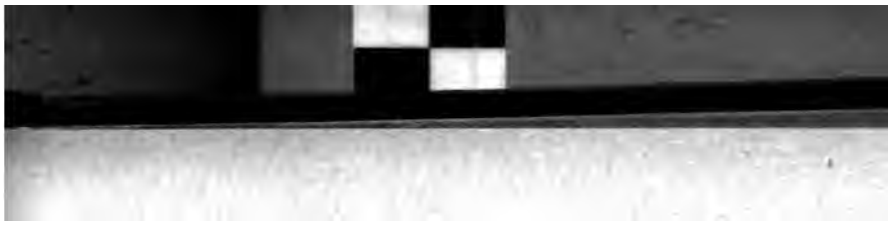
Q. Did you go alone?

A. On one occasion I went alone.

Q. In a row-boat?

A. No, a sail-boat.

Q. Landed in front of the horse dock?



A. Yes, sir.

Q. This was a direct line of smell from where you were to the horse dock?

A. Yes, sir; from our place to the horse dock.

Q. You want the Board of Health to believe you could trace that smell directly from one place to the other?

A. I found it was the same smell that I had smelled at the horse dock; when I started the whole air was impregnated with the same kind of smell.

Q. How could you tell the source?

A. Before going down to trace them up I had got to be an expert; I studied odors.

Q. From some little treatise?

A. From the different smells that there were.

Q. You get smells at Rockaway park, then?

A. Oh, no.

Q. How could you study up the smells, then?

A. I mean offensive smells.

Q. You made that your business?

A. Yes, sir.

Q. You say there were two occasions that you followed this smell to Mr. White's place of business?

A. Yes, sir.

Q. How many times to the fish factory?

A. Probably the same number of times.

Q. You think there is a distinction between the smells of the various fish factories?

A. I think there is a distinction between the smell from a fish factory and from a horse factory.

Q. There are two fish factories; you could not tell from which of them the smell you were in search of originated?

A. No, sir; they were close together.

Q. Did the odor get stronger as you approached the horse factory?

A. Yes, sir, very much.

Q. You went inside?

A. No, sir, I did not go inside.

Q. When you started you were bound to go there?

A. Yes, sir, I intended to go there; I did not go inside the horse factory at all; on those occasions I did not enter it; I got as close as I could, twenty-five feet of the door; that is as far as I was allowed to go.

Q. So that what particular process these smells arose from you did not know?

A. No, sir, not on those occasions.

Q. How many other occasions were there?

A. Probably a dozen times.

Q. Not tracing smells?

A. No, sir.

Q. On these other occasions when you went to the horse factory the smells were not so strong?

A. I got there when there was no smell at Rockaway park.

Q. Only two occasions when there was a smell at Rockaway park?

A. No, sir, I have been there on other occasions when there were smells from Rockaway park.

Q. You got inside the factory when there were smells at Rockaway park and when there were no smells at Rockaway park?

A. Yes, sir.

Q. You saw the various processes?

A. Yes, sir.

Q. The factory was in about the same condition every time you went there, both when you were tracing smells and the other times?

A. Very nearly.

Q. Was it day or night when you were there on other occasions?

A. It was daytime when I was there.

Q. You went down there to look for proof to testify before the Board of Health?

A. No, sir, I went down to find out whether the smell came from the horse or the fish factory.

Q. You went in the horse factory on some occasions when there was no smell from Rockaway park?

A. Yes, sir.

Q. For the purpose of giving testimony before this Board of Health?

A. I have been there, not for the purpose of giving testimony before this Board of Health, but for the purpose of giving testimony.

By Mr. WHITAKER:

Q. Which is the stronger odor, that from the horses or the dead fish?

A. The horse factory is more offensive.

Q. Can you smell it further off than the odor from the rotten fish?

A. I don't know; I have smelt both at Ozone park.

Q. You don't think that a dead horse could be smelled as far off as a heap of dead fish?



A. I don't know anything about that.

Q. You can't smell a dead horse lying in a field as far as you can a heap of putrid fish?

A. That would be owing to the quantity.

Q. Is not the smell from putrid fish more pungent?

A. Yes, sir.

Cross-examination:

Q. Did you see any decayed fish in the fish factory?

A. I have seen fish with maggots crawling out of them, that is fish spread out, and I have seen them boiled and ready to be boiled.

Q. Did you see the processes carried on in the fish factory?

A. Not thoroughly; I saw the vats; I have seen scrap, after it was pressed, taken out, put on the platforms; I have seen fish before it was put in the vats and I have seen them unloaded from the boats.

Q. Did they look like fresh fish?

A. Some were alive and some dead; I did not detect any odor from them.

Q. You say you saw them boil, or going to boil, what?

A. To boil fish; they were getting ready to put them in the tanks and they were unloading them from the boat.

Q. Didn't you see them take them from the boat on the cars and dump them into the vats?

A. Yes, sir; I only observed, in going through the factory, the different processes of boiling, drying and unloading of the boats; I never went into details.

Q. You referred to decaying matter; what did you mean?

A. I mean the scrap I saw ready to dry in the sun.

Q. That was the only part in which you detected a disagreeable odor?

A. It seemed to be all over the factory.

Q. Do you mean to be understood as saying that the odor stayed in one block?

A. It is all over the place.

Q. How can you distinguish the odor from one part of the process from the odor from another part?

A. I do not pretend to distinguish.

Dr. SAMUEL D. NUTT, being duly sworn, testified as follows:

I am health officer of the town of Jamaica, Queens county.

Q. You know Barren island?

A. Yes, sir.

Q. Did you make a visit to Barren island during the present year?

A. Yes, sir, on June fourth.

Q. For what purpose?

A. I went there by request of Mr. Williamson, representing the Rockaway Park Improvement Company, to find out the condition of the place, what the trouble was; there had been several complaints made to me of this smell in my own town, Ozone park.

Q. State to the committee what you found on Barren island; how did you go there?

A. I went down in a sail-boat; there were none but boatmen with me; I landed at the dock of Coe's factory and went ashore and met a man on the dock who wanted to know my business there; he rather objected, but finally I went ashore and went into the fish factory; I saw them boiling fish; some fish were in the tanks and a couple of colored men with pitchforks were turning them over; the tanks were not covered.

Q. Did you see any fish spread on the platforms?

A. Yes, sir, I left the factory and went across, I should judge, about two or three acres with fish spread out to dry.

Q. What was the condition of the stuff?

A. It was very offensive; I walked across it and afterwards I had to throw my shoes away.

Q. Was the condition of the fish decayed or rotten?

A. It must have been or it would not have given forth the odor it did.

Q. It gave forth a very offensive odor?

A. It had a nauseating effect.

Q. When you saw these tanks were they boiling fish?

A. Yes, sir.

Q. There was a vapor coming from it?

A. Yes, sir; it was an offensive vapor, although not as much so as from the fish that was spread out to dry.

Q. There are two factories there; did you go into both of them?

A. I understood the two were conducted on the same principle and I thought that having seen one it was not necessary to go into the other; I went into the horse factory; on the first floor there were new barrels containing oil and some boxes piled up; up stairs I came to a large room; there were about fifteen or twenty carcasses of dead animals in it in various stages of decomposition; heaps of decomposed animal matter, principally viscera of animals; one man took the hide off, another cut the carcass up; there was a very offensive smell there.

Q. Did you go through any other part of that factory?

A. No; I had been chased about by one man and another to get me out, and finally they got hold of me and I was put out.

Q. Did you notice whether the doors and windows were open?

A. They were all open.

Q. Did you go into the factory of Coe, the fertilizer factory?

A. That was the first I visited.

Q. What did you find?

A. They were boiling fish in vats, although the further processes I did not know.

Q. Mr. Coe's fertilizer factory, is it?

A. I don't know the names of the factories.

Q. Were you in the factory where you say they manufacture fertilizers?

A. Yes, sir; I saw sheds outside, and immense piles of powder that they told me was fertilizer; I did not understand the process of the manufacture, but they were boiling in the vats.

Q. What about the mixture that was boiled up; did that have an offensive smell?

A. Yes, sir; it did have an offensive smell.

Q. Was there any sludge acid?

A. I don't know anything about sludge acid; I detected these odors at Ozone park, these same odors.

Q. How far away do you call Ozone park from Barren island in a direct line?

A. I am not familiar enough to be exact; it is about thirty minutes' ride from Rockaway Beach; I have detected these same odors at Ozone park distinctly.

Q. How often?

A. About twice during the past summer, that I recollect; once I was not feeling very well and the odor nauseated me at the time; it was in the latter part of August.

By Mr. PRENTICE:

Q. How long have you been health officer of Jamaica?

A. Since the first of last April.

Q. From what college did you graduate?

A. From Bellevue Hospital in 1886.

Q. You know Dr. Janeway?

A. Yes, sir.

Q. How does he stand on sanitary matters?

A. I have a great deal of respect for his opinion.

Q. He was health commissioner here at one time?

A. Yes, sir.

Q. Did you make any report of this visit of yours?

A. No, sir.

Q. You made a verbal report to Mr. Williamson?

A. Nothing more than when I came back he asked me what I thought of the island, and we had some joking comments on it; this was about all; I made no official report.

Q. What time was it when you went down?

A. Between 10 and 11 o'clock and returned between 3 and 4.

Q. Do you know whether horse loads had come in when you were there?

A. I do not know.

Q. On the fourth of June?

A. I don't know.

Q. Which way was the wind that day?

A. I do not know; there was no smell on that day to detect it.

Q. When you started you had nothing to guide you, to trace any smell?

A. No, sir.

Q. It was between 10 and 11 that you were at the place you call the horse factory?

A. It was between 10 and 11 that I started from Rockaway Beach.

Q. Well, it was before 12 o'clock?

A. I think it was after 1; I went across in a small boat first to Coe's factory and had to walk the length of the island; I had difficulty with the boat breaking a rope, which delayed probably two hours.

Q. When you got to the horse factory, was there a boat lying at the dock?

A. Yes, sir.

Q. Is that the boat from which these carcasses were unloaded?

A. I could not tell.

Q. Is it not a fact that that factory has sliding doors and was closed in, except at the doors?

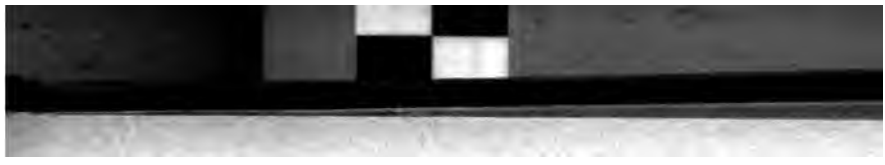
A. I know these doors were open.

Q. Except at the doors of the room where the carcasses were, it was closed; there were no windows there?

A. I did not notice.

Q. Is it not a fact that the only openings were at the landing stations and sliding doors?

A. I know that these were open; I would not say it was the only place.



Q. Had it a roof sky-light?

A. I think it had.

Q. When you were at Coe's, you say, you saw some boiling going on; of what material?

A. It was fish; I did not see it put in; I saw it in the vats.

Q. That was at Coe's?

A. Yes, sir.

Q. How do you know?

A. I saw the name up on the place.

Q. Where was it in that place that you saw piles of materials that you said was fertilizer?

A. I went from the factory and turned around to the left, into the yard.

Q. Where was the odor most offensive, where piles of material were or where they were putting fish in the vats?

A. It was most offensive were it was spread out.

Q. At Coe's place, did you find scraps spread out?

A. Yes, sir; they had it on three or four acres of ground in open space.

Q. This material spread out, was it dry or wet?

A. Most of it was dry and some appeared to be wet that was spread fresh.

Q. Was this material that you saw in heaps called fertilizer?

A. No, sir; the other seemed to be powder.

Q. Do you know the difference?

A. No, sir.

Q. Is it not possible that you have confounded one of the fish factories with Coe's factory?

A. Possibly.

Q. Did you notice any different odor when you were there?

A. I noticed a difference between the odor from the fish and the odor from the horse factory.

Q. Is one an ammoniacal odor?

A. Yes, sir; the fish.

Q. Does that carry further, or not so far as the animal odor?

A. I should say it would carry further.

Q. When that day did you first notice the peculiar odor of dead animals; was it at Coe's or White's or at the fish factory?

A. It was as I approached the island; after I came; I did not know the difference between the smells; but afterwards from wha I saw of the factories I should judge it was when I turned around the island, half a mile away; about the same time I detected the fish odor; I

think I detected the two odors together; I could not differentiate at the time, but from what I saw afterwards I think I detected both odors at the same time.

Q. You are reasoning backwards?

A. Yes, sir.

Q. And reasoning from what you saw there, there must have been a difference, you say?

A. Yes, sir.

By Mr. FRANKENHEIMER:

Q. How far were you from the fish factory when you detected the distinctive fish odor?

A. I did not detect it as a distinctive fish odor till I went alongside of the factory; when I went in and found the fish and found what the odor was.

Q. Is it not a fact that odors do blend?

A. Yes, sir.

Q. They are gases?

A. Yes, sir.

Q. They may blend in the air?

A. They will.

Q. Is there not also from the consumption of this offal, garbage and old horses an ammoniacal smell; don't that produce ammonia?

A. Yes, sir; that produces ammonia; it is more distinctly the odor of this decomposing animal matter.

Q. If smells do blend there are various establishments on that island that produce smells; do you mean to be understood that you could detect distinctly a smell half a mile away from the island and trace it to its source?

A. I have simply reasoned it out since, after thinking the matter over.

Q. Then you simply characterize the whole odor that comes from Barren island as Barren island odor?

A. Yes, sir.

Q. You don't attempt to distinguish between the odors?

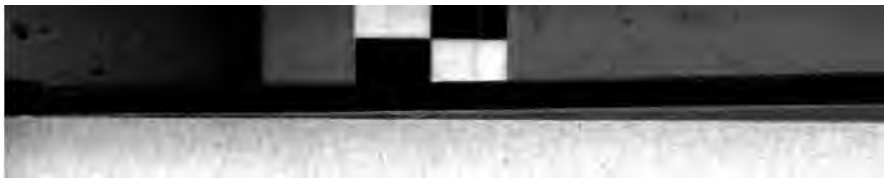
A. No, sir.

Q. You say you are health officer of Jamaica?

A. Yes, sir.

Q. Did you occasionally get odors from places in the vicinity of Jamaica that have nothing to do with the Barren island odor, that were very offensive?

A. We have not this summer.



Q. Is there not a bone-boiling establishment in the vicinity of Jamaica?

A. Not that I know of.

Q. When manure is spread upon the fields in the vicinity of Jamaica, is there not an odor from it?

A. There might be for a short distance.

Q. That is also an ammonia odor?

A. Yes, sir.

Q. Do you mean to be understood as saying that the odor which emanates from the fertilizers is different from the odor of fresh manure?

A. Yes, sir, one is a vegetable and the other is animal; one is fish.

Q. Is not horse manure animal matter?

A. It is animal matter, but it is the product of grain food; it has ammonia; it has a decided ammonia smell.

Q. Is the odor at the fish factories any more offensive than that?

A. Yes, sir.

Q. So far as you smell the decaying scrap — that is, the part that you refer to — is that the part of the process which creates the offensive odor?

A. Yes, sir.

Q. Did you see the whole process of making fish-scrap?

A. I don't know whether I saw the whole process or not; I had nobody to conduct me through the institution and I found out what I could.

Q. You were at liberty to go through?

A. No, sir, not when they found out I was going through.

Q. Did you see the fish land?

A. There were no boats in.

Q. Did you see the fish boiling in the vats?

A. Yes, sir, and I saw the steam escape.

Q. Was it offensive?

A. Yes, sir.

Q. Any more than that of boiling fish?

A. Yes, sir, I think it was.

Q. Was it as offensive as the smell you say emanates from the scrap that was spread out to dry in the sun?

A. It was not as offensive.

Q. You don't know anything about the condition of the fish when they are landed there?

A. No, sir.

By Mr. PRENTICE:

Q. Is there not a good deal of artificial manure used all along Long Island?

A. I don't know; I don't think there is much in our town.

Q. Did you ever notice the smell of the manure on the cars or on the garden farms?

A. I have noticed it on the farms riding by.

Q. The same kind of smell you had on the island?

A. No, sir; the fertilizer that I have seen is simply manure; I have seen no artificial fertilizer.

Q. Are there not factories near Ozone park?

A. There is one factory at Woodhaven.

Q. Do they not use crude petroleum as fuel?

A. I think they do.

Q. Is there not an odor from it?

A. I never detected any.

Q. Can you remember any time when the wind was blowing from the direction of the factory of Woodhaven whether there was an odor or not?

A. I have never detected any; my business calls me about the factory almost every day; from the odor I never would know they were using petroleum there.

JOHN H. ELDERT, being duly sworn, testified as follows:

Q. Where do you live?

A. In Jamaica.

Q. What is your employment?

A. I am not at any now; I sold my farm last March.

Q. Do you know where Barren island is?

A. I have lived at Jamaica eight years; formerly at New Lots.

Q. Have you been to Barren island during the present year?

A. On the fifteenth of May, and on the twenty-ninth of May and in the latter part of June; I went down on the first occasion alone.

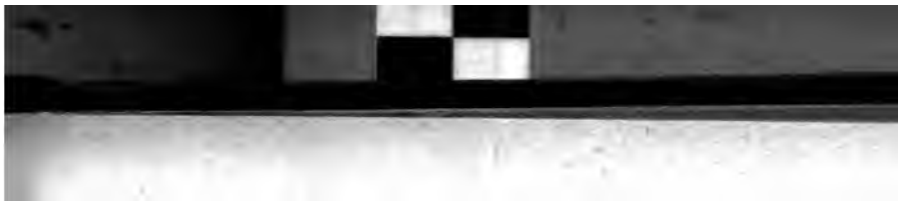
Q. What did you find on Barren island?

A. I found fertilizer factories, horse factory, fish factory.

Q. Did you ere, going to the island — did you detect any smell at Rockaway Beach or vicinity when the wind was blowing from the direction of Barren island?

A. None at Rockaway park, but from Jamaica and also from New Lots I did.

Q. When you got to Barren island did you find any occupations represented there which produced an offensive smell?



A. Yes, sir; there was smell produced by the fertilizer factory and dead horse factory; the first occasion the fish factory was not in operation.

Q. Tell what you found at the fertilizer factory?

A. The bad smell was caused by the ingredients used in mixing the fish scrap; acids were used; it was a very pungent and very offensive odor.

Q. Have you detected it at any distance from the island?

A. Yes, sir; at New Lots and also at Jamaica the same smell.

Q. How about the fish factory?

A. I never detected any smell from the fish factory at New Lots or Jamaica; on the first occasion, the fifteenth, they were not in operation; on the twenty-ninth there was a smell from the fish factory from the fish scrap; I saw it on the platforms; its condition was somewhat dry; others were in heaps covered with canvas; I did not examine it closely; those in heaps I presume lay there several days from the looks of them; there was considerable smell; I did not see them boiling fish.

Q. How about the horse factory, was there smell there?

A. There was a smell there on the first occasion; I did not see any carcasses; the second occasion there were several carcasses of horses, dogs, goats, etc.; they were on the second floor; they were skinning them, cutting them up and putting them into vats; it was the smell of decayed animals; a very offensive smell.

Q. Was the room where they were cutting up those animals open?

A. It was open towards the bay?

Q. How about the ceiling, the top of it?

A. I believe there were sky-lights there; I am not positive.

Cross-examined:

By Mr. PRENTICE:

Q. When you were at the horse factory were they boiling horses?

A. I think they were on one occasion.

Q. In open vats?

A. No, sir.

Q. When put into the vats, was there any smell?

A. A smell from the offal.

Q. After putting them into the vats?

A. The smell from the factory was created from having animals on the floor.

Q. That smell, you could not trace it far off?

A. I suppose not over a quarter of a mile.

Q. The general odor from the building itself?

A. I could not say; I could not tell what they were doing.

Q. What time of day was it?

A. Half-past 11 o'clock.

Q. Had the boat come in from New York with the offal?

A. On both occasions it had, I think.

Q. They were disposing of the boat-load received that day?

A. Yes, sir.

Q. At New Lots, Jamaica, are there railroads there now?

A. Yes, sir.

Q. They carry a good deal of this fertilizer manure?

A. Yes, sir.

Q. There are large shipments of it over the island?

A. Yes, sir; fertilizer and horse manure both.

Q. Was there any offensive odor from the fertilizer in the cars?

A. I never noticed any.

Q. Fertilizer might smell?

A. But not if put in box cars.

Q. But they unload them?

A. Yes, sir.

Q. When unloading, is there a smell?

A. There is a smell of horse manure, but not from fertilizer; some has no smell.

Q. Is it the same smell as you noticed at the factory?

A. Yes, sir.

Q. It is about as much a nuisance when unloading a car anywhere on Long Island as you find on Barren island at the heaps?

A. The smell that I noticed in unloading cars was not the same as I noticed at Barren island.

Q. How do you distinguish the smells?

A. The different qualities of the fertilizer; I handled different fertilizers myself on the farm; I know the different grades and the different smells.

Q. Is not all the fertilizer manure made on Barren island about the same?

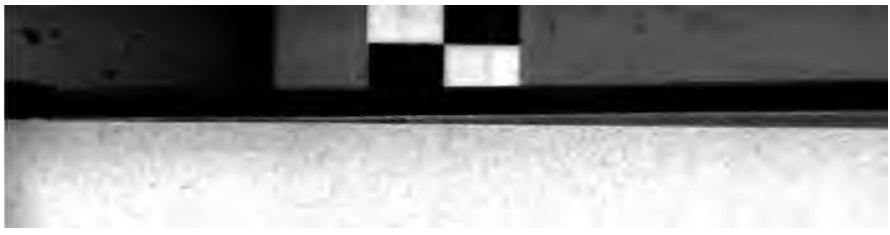
A. I could not say.

Q. Do you know any difference between the fertilizer that is made on Barren island and that from any other phosphate works in the United States?

A. Yes, sir.

Q. What is the distinction?

A. The Forester fertilizer has no smell, or little or no smell.



Q. Whereabouts is the factory?

A. I don't know; I guess it is in Jamaica.

Q. Any other?

A. That of E. Frank Coe, factory has a very strong smell; it is better known as Farmer's Pride; it has a very offensive odor; that manufactured by the Bradleys is different, has a different kind of smell, not so strong.

Q. Where are the other factories?

A. The Bradley factory, I believe, is in Boston; the E. Frank Coe factory is on Barren island.

Q. Do you know which is the best of these fertilizers?

A. That depends upon the soil; on a light soil the Coe's work best.

Q. The soil about Jamaica; is it light or heavy?

A. It varies; some is light and some heavy.

Q. Who employed you to go down and make this investigation?

A. The Rockaway Park Improvement Company?

O. L. S. SCHWENCKE, being duly sworn, testified as follows:

Q. Where do you live?

A. At Rockaway Beach; I live there all the year around.

Q. Do you know where Barren island is?

A. Yes, sir.

Q. How far is Barren island from your house?

A. Four miles or four miles and a half.

Q. Have you detected offensive smells when the wind blows from Barren island?

A. Yes, sir.

Q. How long have you lived there?

A. Two years in May.

Q. How often do these smells appear?

A. Whenever the wind is westerly.

Q. What is the character of it?

A. It is a very sickening smell, very offensive, but more so in summer time.

Q. Have you been on Barren island?

A. I have been on it; I did not inspect the factories; I got sick before getting near enough to them.

Cross-examination:

Q. Do you live in Rockaway in summer.

A. Yes, sir.

Q. For two years?

A. Yes, sir.

Q. Your family there?

A. Yes, sir.

Q. You say whenever there is a westerly wind you always have a smell from Barren island?

A. Yes, sir.

Q. Always?

A. Yes, sir.

Q. No exception at all?

A. No, sir.

Q. In summer only?

A. Yes, sir; in summer and winter; the smell is not as strong in the winter, but you will always smell it.

Q. Is it as strong in the winter as in the summer?

A. Not as strong in the winter; when you live where I live, when I pass the island and the wind is in that direction it is very near as strong.

Q. You say on one occasion you were going to Barren island and you got taken sick from the odor; when was that?

A. Four years ago.

Q. Were you going to make a visit to Barren island?

A. Yes, sir; I went there on purpose to take a look to see what they were doing with the dead animals.

Q. You were taken sick?

A. Yes, sir.

Q. Sick at the stomach?

A. Yes, sir; I stayed there too long; I had landed on the island; I did not vomit, but I would have if I had stayed there; the sensation came on.

Q. This is the only time you made an attempt to get on the island?

A. Yes, sir.

Q. The smell of last summer was not as strong as in 1889?

A. Not at all times.

Q. Can you tell how many times during the summer you smelled this very offensive odor?

A. I did not keep a book; I don't expect less than 150 times.

Q. That would be once a day for three months — At your house?

A. Not at my house; I have occasion to go down there; I pass there for pleasure, fishing and shooting, maybe three or four times a week.

Q. And you smelled it 150 times in the summer?

A. When fishing I have occasion to look for fish all around the island and I am bound to get the smell.



Q. You stayed there fishing?

A. Yes, sir.

Q. Often?

A. Yes, sir.

Q. When they were working in the factories?

A. Yes, sir.

Q. It did not make you sick then?

A. I always managed to get to windward.

Q. Have you any business relations with the Rockaway Park Company?

A. No, sir.

Q. Never had any, or with the Manhattan Beach Company?

A. None whatever.

By Mr. FRANKENHEIMER:

Q. The smell which you noticed you also noticed in winter?

A. Yes, sir.

Q. How long have you been down there?

A. Two years.

Q. For two winters you have noticed this smell?

A. Yes, sir.

Q. This smell you speak of is offensive?

A. Yes, sir; when I get near to it I can distinguish one from the other; it is a combination between two smells; I never smelled Coe's dock much; it is the fish dock and the horse dock.

Q. When you got to leeward of these works you always smelled it?

A. Yes, sir.

Q. During the winter you also smelled this combination smell?

A. Not so strong.

Q. But you did smell it?

A. Yes, sir.

WILLIAM E. BURROUGHS, being duly sworn, testified as follows:

Q. Where do you live?

A. In Brooklyn.

Q. Are you familiar with the territory in the vicinity of Barren island?

A. I have never been there; I am familiar with Rockaway Beach.

Q. You know where Barren island is?

A. I do.

Q. Have you detected any bad smell on Rockaway Beach, or in that neighborhood when the wind was blowing from Barren island?

A. Yes, sir.

Q. How often?

A. I do not know; I would not like to say; several times, a very disagreeable smell.

Q. Where have you been when you detected it?

A. I have been at Auvergne.

Q. Between Rockaway Beach and Far Rockaway?

A. Yes, sir.

Q. How far is Auvergne from Barren island?

A. Perhaps five miles.

Q. Is it disagreeable there?

A. Yes, sir.

Q. Strong?

A. Yes, sir.

Q. What is your occupation?

A. I am secretary and treasurer of the Auvergne Improvement Company.

Cross-examination:

By Mr. PRENTICE:

Q. Can you mention any day on which you detected those odors?

A. I can not; I can not give dates.

Q. Do you remember what month it was?

A. I would not like to answer that.

Q. Do you know in which direction the wind was?

A. I should say from the west.

Q. Do you remember what time of day it was?

A. I should say between 10 o'clock and noon.

Q. Was that the usual time you noticed these odors?

A. I don't know that it was; I think I have noticed them at other times.

Q. Was there any time in the twenty-four hours when they were specially noticeable?

A. From my recollection, I should say not particularly.

Q. Would it make any difference in the direction of the wind?

A. Yes, sir.

Q. Is there anything now by which you can distinguish these odors to say from what source they proceed?

A. What do you mean?

Q. Can you say the odor came from one factory, from one material or another?

A. No, sir.

By Mr. FRANKENHEIMER :

Q. Have you been there in the winter?

A. Yes, sir.

Q. Have you noticed the smell in winter?

A. Yes, sir.

Q. The same smell?

A. About the same.

JOHN C. LEFFERTS, being duly sworn, testified as follows

Q. Where do you live?

A. At Rockaway Beach.

Q. What is your business — Do you live there the year around?

A. Yes, sir; for the past two years.

Q. Do you know Barren island?

A. Yes, sir.

Q. About how far from your house is it?

A. About four miles.

Q. When the wind blows from the direction of Barren island do you get any offensive smell at your house?

A. Many times I have.

Q. How often did you get it? Whenever the wind blows that way?

A. I cannot say; I have not noticed it on all occasions with a westerly wind, but on many occasions.

Q. Can you give me the character of the smell?

A. To me it is exceedingly nauseating and offensive ; many times it is stronger than at others.

Q. Is it always the same?

A. I have not tried to define any particular smell at all.

Cross-examination:

Q. Is it noticeable at any particular hour of the day?

A. I recollect on two occasions in the last two weeks we noticed the smell about 8 o'clock train in the morning.

Q. Have you been on Barren island?

A. No, sir.

Q. Do you remember in what year you first noticed these odors?

A. I cannot particularly say as to the year ; I would put it as long ago as 1865 ; I have known it for the past twenty years; during that time I had occasion to smell more or less of these odors.

Q. As far as you recollect it is the same kind of odors?

A. Yes, sir.

Q. Since 1865

A. Yes, sir.

By Mr. KELLY:

Q. There has been considerable difference in that territory within the last ten years?

A. Yes, sir.

Q. New villages have sprung up?

A. Yes, sir.

Q. And the population has more than doubled?

Cross-examination:

Q. Before you got your present residence you were in the habit of going to Rockaway Beach frequently?

A. Yes, sir.

Q. To spend the summer?

A. Yes, sir.

Q. How long ago did you purchase your house?

A. I don't own the house; I lease it; I leased it two years.

Q. Before that you were in the habit of going there every summer?

A. Yes, sir.

Q. d you took a house down there to live there all the year round?

A. Yes, sir.

Q. Do you detect a smell in winter?

A. Yes, sir; the same general character.

MICHAEL B. HOLLAND, being duly sworn, testified as follows:

Q. Where do you live?

A. At Rockaway Beach.

Q. How long have you been there?

A. Thirty-two years.

Q. Do you know Barren island?

A. Yes, sir.

Q. What part of the beach is your residence?

A. Holland Station.

Q. Do you live there the year around?

A. Yes, sir.

Q. Do you detect a smell at your residence when the wind is blowing from Barren island?



A. Yes, sir; quite often; I could not tell how often; whenever the wind is that way.

Q. What sort of a smell is it?

A. Very often like stinking corned beef.

Q. Any other variety?

A. I have smelled kerosene oil and fish.

Q. These smells are all of them offensive?

A. Yes, sir.

Q. Have you been on Barren island?

A. Yes, sir.

Q. How long is it since you have been there?

A. Not for ten years.

Q. You detect these smells when the wind comes from that direction?

A. Yes, sir.

Q. What is your business?

A. I am a real estate agent and builder; I am not interested in the Improvement Company: I am agent for my mother and a builder on my own hook.

Cross-examination:

Q. The smells you have detected all the year around?

A. The horse factory has been there all along, and since the fish factory has been established I have noticed it, too.

Q. How often during the summer months is it that you detect this smell?

A. Whenever the wind comes light west we get it; I get it very strong.

By Mr. KELLY:

Q. You have been postmaster there?

A. Yes, sir.

Q. Been there all your life?

A. I went there when I was 8 years old; the horse factory is the most disagreeable to me of any.

Q. Is it to most people?

A. I could not say about that; I have kept a hotel a great many years and they have found a great deal of fault with the odor; for the last seven years I have not been in the hotel business.

Cross-examination:

Q. I understood you to say that you smelled the same smell all the year around?

A. Whenever the wind comes that way; sometimes we smell only the fish; sometimes the horse smell; at other times the smell of kerosene.

Q. Do you get any fish smell during the winter?

A. Yes, sir.

Q. What you call fish smell you got during the winter, the same as the summer?

A. Yes, sir; but not so strong.

By Mr. PRENTICE:

Q. This kerosene smell came from Barren island?

A. It came from that direction; I never followed it up.

Q. Did you notice whether it was greater at any hour of the day?

A. I noticed it in the morning; sometimes at sundown, whenever the wind comes that way.

Q. You never endeavored to distinguish whether it came from any particular process or material?

A. No, sir; I never went into the factories.

Q. You have been engaged in this place in building and real estate for how long?

A. About seven years in real estate and three years in building.

Q. Real estate has been commanding a better price there?

A. Yes, sir.

By Mr. KELLY:

Q. These smells from Barren island are the subject of general complaint?

A. Everybody that ever smells them once, they know them again.

Cross-examination:

Q. Quite a number of people are in the habit of coming down there in the summer, and have leased places there?

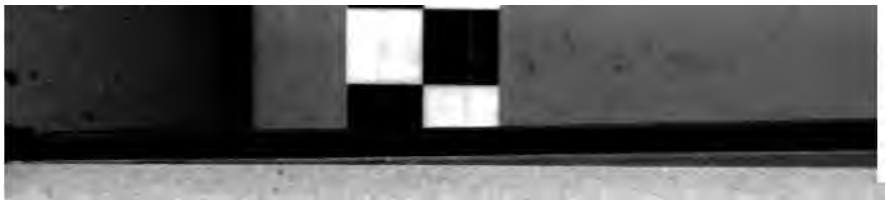
A. Yes, sir.

Q. And live there all summer?

A. Yes, sir.

Q. And the smells are most offensive in the summer?

A. Yes, sir.



WILLIAM S. WILLIAMSON, being duly sworn, testified as follows:

Q. Where do you live?

A. At Jamaica, Long Island.

Q. What is your business?

A. I am a man of leisure.

Q. Do you know where Barren island is?

A. Yes, sir.

Q. Have you ever been there?

A. Not in a great many years.

Q. Have you ever detected any bad smells from Barren island when the wind blows from it?

A. Yes, sir, I have detected it from the house where I live, also at Rockaway park.

Q. What time of day was it?

A. Where I live I have detected it more frequently towards the evening when the wind was from the direction of Barren island.

Q. As the wind blows from Barren island it comes across Jamaica bay; what else does it strike before getting to you?

A. It strikes the main land of the island.

Q. Are there any other factories that create a smell between you and Barren island when the wind blows from that direction?

A. Not that I know of.

Q. How many miles is your house from Barren island?

A. I suppose eight miles, not less than that.

Q. What sort of a smell is it?

A. A very pungent, sharp odor — offensive.

Cross-examination:

Q. You never traced this smell back?

A. No, sir.

Q. Do you remember the year you first noticed it?

A. The Barren island smell for half a dozen years; I have lived there before and all my lifetime where I now live?

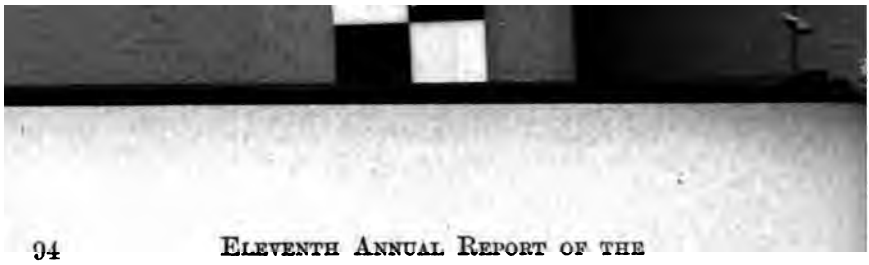
Q. Was the smell any less than past years?

A. No, sir.

Q. You never traced it to its source?

A. No, sir.

Q. Do you know what factories are between Barren island and your house?



A. I don't know of any; I don't think there is one of any description.

Q. Did you notice this kerosene smell the last witness spoke of?

A. No, sir.

Q. Did you ever notice a kerosene smell?

A. I can hardly describe it; it is very offensive.

Q. Did you ever notice a kerosene smell?

A. I can't say it is exactly a kerosene smell; it might be something on that order?

By Mr. CANTOR:

Q. You detected the smell winter and summer?

A. More frequently in summer.

Q. Are you related to Mr. Williamson, who was on the stand before?

A. He is a nephew of mine?

By Mr. WHITAKER:

Q. Did you ever smell a dead horse?

A. I have; it is not a dead horse smell.

Q. Have you been at Rockaway park?

A. Yes, sir.

Q. You can see Barren island?

A. Yes, sir.

Q. You smelled it then with the wind blowing towards you, and there was nothing between you and Barren island?

A. Yes, sir.

Cross-examination:

Q. How many times were you at Rockaway park?

A. I have been there twice; I have observed the smell only once; I was there last August; I did not smell it then, but I did a year ago.

Q. Did you ever smell putrid fish?

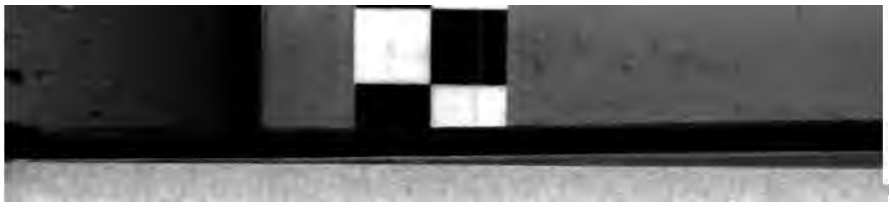
A. Yes, sir; I could not tell you from the smell whether it was from dead horses, putrid fish or not; it is a combination smell.

LOUIS WOLLENWEBER, being duly sworn, testified as follows:

Q. Where do you live?

A. At Rockaway Beach.

Q. How far from Barren island?



A. About three and a half miles.

Q. How long have you lived there?

A. Eleven years.

Q. When the wind blows from the direction of Barren island have you detected any smell that you recollect?

A. Yes, sir; a very bad smell sometimes.

Q. Is it one kind of a smell or more than one kind?

A. Different kinds.

Q. You say your place is how far from the island?

A. About three and a half miles.

Q. And you detect the smell?

A. I detect tho smells when the wind is westerly; I can see Barren island from my place; if I stand on my property I look straight on to Barren island; I am only 240 feet from the bay; I live westerly from Rockaway.

Q. Have you a hotel?

A. Yes, sir.

Q. What is the name of it?

A. The Hanover House; opened in 1879, in November.

Q. Were the smells as bad then as now?

A. I don't know; at that time there was a factory there.

Q. Any odors?

A. After my house was done I moved down right in the season and I got onto the smell; I asked about it and they told me there was a horse factory there; I never knew about it before.

Q. Was it somebody of the Rockaway Improvement Company who told you?

A. No, sir; I don't remember; I was down there when they built the big hotel; I had a great many carpenters and foremen boarding with me; they told me about it.

Q. Property has grown in value about there, those three years?

A. I don't know about that; I saw people like myself wishing to sell, and I can not get back the money I put there; right in my own neighborhood are eight cottages and the owner could not sell them except to his own relation.

Q. Do you think these smells improve the property?

A. No, sir.

Cross-examination:

Q. Did you get an offensive smell all the year around?

A. No, sir; only when the wind is in the west.

Q. When it comes from the west you get the smell in summer?

A. I get it always.

Q. Not in winter?

A. Yes, sir; the same smell, but not so heavy; I get it all the year around, when the wind comes from that way.

CHARLES E. TWOMBOY, being duly sworn, testified as follows:

Q. Where do you live?

A. Jamaica bay.

Q. How long have you lived there?

A. Twenty years.

Q. What is your business?

A. Contractor.

Q. Do you know where Barren island is?

A. Yes, sir.

Q. You have recently been working on Rockaway park?

A. Yes, sir, building streets.

Q. You were down there frequently during the past summer?

A. Yes, sir.

Q. Do you know where Barren island is?

A. Yes, sir.

Q. When the wind blows to Rockaway from Barren island do you detect any smell?

A. Yes, sir, a very disagreeable smell.

Q. How often do you suppose you get that disagreeable smell?

A. Twice last summer; I was down before that working there last year; I detected the smell then; I could not say how often; I smelled it going past in boats; I got it when I go out fishing; I went near the island and it seemed to me it was from Barren island.

Cross-examination:

Q. How far away from the island were you fishing?

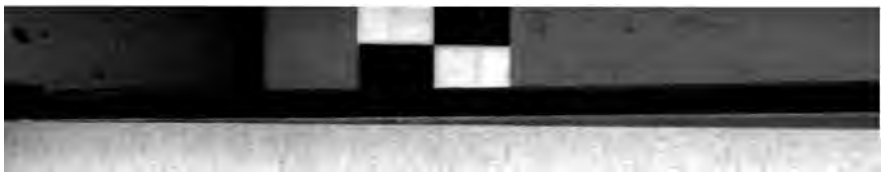
A. A thousand feet.

Q. Do you fish there frequently?

A. Once that season.

Q. This occasion you speak of when you smelled it?

A. When I went fishing I smelled it.



Q. You smelled it once this year and last year and before when you were fishing?

A. Yes, sir.

Q. Those were the only occasions you smelled it?

A. I smelled it about 5 o'clock in the evening; I could not tell how often.

By Mr. PRENTICE:

Q. Does this smell resemble any other you know of?

A. I don't know, I am sure.

Q. Did you ever notice a smell from a candle factory?

A. No, sir.

WILLIAM C. BAKER, being duly sworn, testified as follows:

Q. Where do you live?

A. In Jamaica bay.

Q. What is your business?

A. Nurseryman.

Q. How long have you lived there?

A. About nine years.

Q. Do you know Barren island?

A. Yes, sir.

Q. Have you been at Rockaway park?

A. I have.

Q. Have you detected any bad smells from Barren island when the wind was blowing from that direction?

A. Yes, sir.

Q. Were you there when you detected them?

A. I have been at Jamaica when I detected them, at Rockaway park, and I have been out passing the factory while going to fish.

Q. You have been down to Barren island?

A. Yes, sir.

Q. Have you found this smell on the island itself?

A. Yes, sir.

Q. You recognize that as the same smell that you got at Jamaica and at Rockaway park?

A. Yes, sir.

Q. No mistake about it?

A. I don't think a man could be mistaken about it.

Cross-examination:

By MR. PRENTICE:

Q. Do you remember any date when you noticed the smell?

A. No, sir.

Q. No particular date?

A. I can't give you any particular time when I was in the factory.

Q. Was there any particular hour of the day when you noticed this smell at Rockaway?

A. No, sir; I don't know any particular time; I don't know the time of day; I know we generally noticed it at Jamaica along in the evening; I have noticed it more at Jamaica when the wind was in the southwest, a close muggy day.

Q. Have you noticed it at Jamaica also in the winter?

A. I don't know as I could say whether it was winter or summer; when the wind was in the direction I have stated, we would notice it at Jamaica; I think probably in winter as well as summer, but not so strong.

TIMOTHY F. JONES, being duly sworn, testified as follows:

Q. Where do you live?

A. At Rockaway Beach.

Q. What is your business?

A. An officer of Queens county.

Q. How long have you lived in Rockaway Beach?

A. Twelve years.

Q. Do you know Barren island?

A. Yes, sir.

Q. When the wind blows from the direction of Barren island to Rockaway Beach, do you detect any smell?

A. Yes, sir.

Q. What sort of a smell is it?

A. It is a very sickening smell.

Q. Is Barren island in sight from the place you speak of, Rockaway Beach?

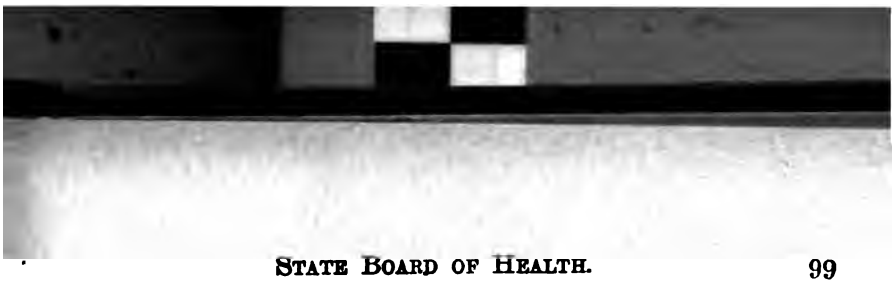
A. Yes, sir; I can see it from any direction from Rockaway Beach.

Q. The wind blows it right to you?

A. Yes, sir; there is nothing but the bay between.

Q. You can not be mistaken about where the smells come from?

A. No, sir; I have been close to it.



Cross-examination:

Q. How often did you notice these smells last summer?

A. On several different occasions; I can say a half dozen times; they were sometimes stronger than at other times.

Q. Did you observe them winter and summer alike?

A. Not so much in the winter as in the summer, but the same kind of smell apparently both times.

(Recess till 2.30 P. M.)

AFTERNOON SESSION.

CASE FOR DEFENDANTS.

Mr. Prentice stated that the gentlemen representing the fish factories had their witnesses present. Among them were several medical gentlemen from Jamaica, who would like to be examined in order to get away.

Dr. PHILIP M. WOOD, being duly sworn, testified as follows:

Q. Where do you live?

A. Jamaica, Long Island; I am a physician in practice there and have been for fifty years; I know where Barren island is.

Q. During your residence have you ever in your neighborhood been troubled with noisome smells in the region of Barren island?

A. Not lately.

Cross-examination:

By Mr. KELLY:

Q. There are two or three gentlemen residents in Jamaica that have testified that they have been troubled with smells from Barren island at different times within the last year or two, and assuming that they stated that under oath here you would not undertake to contradict them would you?

(Objected to; question allowed.)

A. No, sir.

Q. Have you ever been on Barren island?

A. No, sir.

Q. Have you ever been close to it?

A. As near as I could get in the town of Jamaica.

Q. You have never gone in a boat down Jamaica bay?

A. Yes, sir; possibly a mile.
Q. The wind was blowing from the island?
A. It is so long ago; four or five years ago; I couldn't tell.
Q. You stated you have not been troubled with smells lately?
A. Not within two or three years.
Q. Prior to that time you did have a smell?
A. Yes, sir.

Redirect examination:

Q. Has there been any substantial difficulty; if there had been any substantial difficulty or nuisance there you would have noticed it?
A. I am in all parts of the town; all over the town.
Q. Then you would have noticed it?
A. Yes, sir.

Rev. WILLIAM JANES, being duly sworn, testified as follows:

Q. Where do you live?
A. At Woodhaven.
Q. How long have you been at Woodhaven?
A. I have just celebrated my twenty-fifth anniversary as pastor of the Congregational Church.
Q. In the course of your professional duty you are all over the town, I suppose?
A. Yes, sir.
Q. There are some factories there?
A. Yes, sir.
Q. Do you know what kind they are?
A. Yes, sir.
Q. What?
A. They manufacture agate-ware spoons.
Q. Do you know whether they use petroleum as fuel?
A. I have heard they used oil.
Q. Has there been any smell from this factory?
A. I have not noticed any.
Q. Do you know Barren island?
A. Yes, sir.
Q. Have you noticed at your residence or about town any offensive odors or noxious smells?
A. I have not.



Cross-examination:

By Mr. KELLY.

Q. Are there any bad smells in Woodhaven?

A. There may be, but I have not noticed any in connection with the factories there?

Q. You had an epidemic of diphtheria there a year ago?

A. They called it an epidemic; there were quite a number of cases.

Q. Have you ever been down to or on Barren island?

A. I have sailed by it; I go out fishing; I went out last summer.

Q. Did you notice any smell?

A. I did not; I passed out through the inlet within half a mile of ——

Q. Do you rememoer how the wind was blowing at that time?

A. I do not.

Q. You have never been on the island?

A. No, sir; I think I sailed by on one occasion with Captain Roe, now dead; that must be ten or eleven years ago.

J. TYLER WATTS, being duly sworn, testified as follows:

Q. Where do you live?

A. In Jamaica.

Q. What is your business?

A. Insurance.

Q. How long have you been there in that business?

A. I have been in Jamaica twenty-five or thirty years, probably, and in the insurance business twelve years.

Q. Property within the last two or three years has increased in value in the neighborhood?

A. Yes, sir.

Q. You know where Barren island is?

A. Yes, sir.

Q. Have you noticed in your town and about your residence any offensive odors from Barren island, or nauseating smells?

A. No, sir.

Q. You are around a good deal, are you not?

A. Yes, sir.

Q. You would have noticed them if they had been there?

A. Yes, sir.

Cross-examination:

Q. Do you insure any property down there on the island?

A. Yes, sir.

Q. These factories are insured?

A. I don't think I insured any factories.

Q. What property did you insure?

A. I insured dwelling houses and hotels.

Q. On Barren island?

A. No, sir; I did not insure any property on Barren island.

Q. Have you any business connections with any of the gentlemen on Barren island?

A. No, sir.

Q. Did you insure any dwelling houses of Mr. White or of Mr. Fairchild?

A. I can not answer that question directly; it seems possible to me that I inspected a dwelling house for Mr. Fairchild at Woodsburg.

Q. Have you ever been down there on Barren island.

A. I have been there a great many years ago.

Q. Three of your neighbors from Jamaica say that they have detected a smell from Barren island; do you mean to contradict them?

A. No, sir.

By Mr. WHITAKER:

Q. Have you ever heard neighbors complain of the smell in the village of Jamaica?

A. No, sir.

Q. Never heard any complaints from any people there?

A. No, sir.

Cross-examination:

Q. Have you ever heard complaints of Barren island at all?

A. Yes, sir; I have heard complaints from Rockaway Beach of that section, but not lately.

ALFRED H. BEERS, being duly sworn, testified as follows:

By Mr. PRENTICE:

Q. Where do you reside?

A. In Jamaica bay.

Q. What is your business ?

A. Grocer.

Q. Do you know Barren island ?

A. Yes, sir.

Q. Do you know whether any fertilizer manures are used about Jamaica; on the land there ?

A. Yes, sir.

Q. Do you know of its being transported through Jamaica on railroad cars ?

A. Well, I presume it is; I don't know; I know it is used there.

Q. Have you noticed about your store or your residence or in the neighborhood any offensive smells or noxious odors from Barren Island ?

A. No, sir; I have not.

Q. You have a very good opportunity of observing at your place of business if there had been ?

A. Yes, sir.

Cross-examination:

Q. What part of the village is your store in?

A. Nearly opposite the county clerk's office.

Q. That is to the north of the railroad track ?

A. Yes, sir.

Q. How far away are you from Jamaica bay; from the shore of Jamaica bay ?

A. It is called three miles.

Q. How far is it from the northern end of Jamaica bay to Barren island ?

A. I don't know.

Q. What do you think ?

A. I should suppose it must be four or five miles.

Q. Have you any connection with any of these gentlemen on the island ?

A. No, sir; except as I have been introduced to them to-day.

Q. How did you come to be present at the investigation ?

A. Through Mr. Hawkins, a resident of the town, a farmer and dealer in fertilizer.

Q. Mr. Beers, some gentlemen living in Jamaica were examined here this morning, and they said, that on different occasions, they

found a very bad smell from Barren island; do you wish to contradict them?

(Objected to.)

A. I would not assume to contradict them; I have never smelled it or recognized it myself.

By Mr. WHITAKER:

Q. Have you ever smelled any bad smells at your house in Jamaica, odors coming from where you didn't know; something in the air?

A. I did not recently.

Q. At any time?

A. Yes, sir; we once had a fat-rendering establishment in the place; but since that time I don't recall any to mind.

Q. You never have smelled anything in Jamaica except such as you now recall?

A. No, sir; I have recognized no decided odor that I could not account for; my olfactory nerves are good.

WILLIAM DYKES, being duly sworn, testified as follows:

Q. Where do you live?

A. In Jamaica.

Q. What is your business?

A. Real estate and insurance.

Q. How long have you lived there?

A. In the village, probably since 1877, and outside of it eight years before.

Q. You know the country about Barren island, where it is?

A. Yes, sir.

Q. Have you noticed any offensive odors or noisome smells from that direction?

A. No, sir.

Q. You are about a good deal in your business?

A. Yes, sir; real estate has been a good business.

Q. For the last two or three years?

A. Yes, sir.

Q. Property has appreciated?

A. Yes, sir.

Cross-examination:

Q. What is your business?

A. Real estate and insurance.



Q. Are you any connection of any of these gentlemen on the island?

A. No, sir; I don't know them at all.

Q. You were not present this morning?

A. No, sir.

GEORGE CARPENTER, being duly sworn, testified as follows:

Q. You reside in Jamaica bay?

A. Yes, sir.

Q. How many years have you resided there?

A. I have always lived there.

Q. What is your business?

A. I am an assessor.

Q. You are about all over town?

A. Yes, sir.

Q. You know where Barren island is?

A. Yes, sir.

Q. Do you know of any offensive odors or noisome smells from Barren island at Jamaica?

A. Not that I know of.

Cross-examination:

Q. Barren island is not in the town of Jamaica?

A. No, sir.

Q. How many miles is it from your residence to Barren island?

A. Three miles from my residence to the bay.

Q. How far down the bay.

A. About five miles.

Q. Have you ever got any smell from Barren island at any time during your residence down there?

A. No, sir.

Q. Have you ever been down near the island?

A. I have sailed around it.

Q. How close to the island have you been?

A. Probably a mile; I went through the inlet.

Q. Was the wind blowing over to you from the island?

A. I don't recollect.

Q. Have you ever been on the island?

A. I was on the east end.

Q. How long ago?

A. I suppose twenty years ago.

Judge VAN WYKE HEWLETT, being duly sworn, testified as follows:

Q. You are holding the office of justice of the peace?

A. Yes, sir.

Q. At the town of Hempstead, village of Woodsburgh?

A. Yes, sir.

Q. How long have you lived there?

A. I was born there; I have not lived there all the time; I have lived there for the last eight or ten years.

Q. Have you visited the factories of Coe and White on Barren island?

A. I have visited them.

Q. How recently?

A. I think the latter part of June or the first of July.

Q. What condition did you find them in?

A. Fair condition for such business.

Q. Have you traced any odors from that factory at the town of Hempstead?

A. I have smelled odors, but I could not swear they came from that factory.

Q. Since you have been on the island you have not been able to distinguish odors from it at your place?

A. I would not swear that I have.

Cross-examination:

Q. You were at Rockaway park with Mr. Williamson?

A. Yes, sir.

Q. Do you remember the strong smell on that occasion?

A. Yes, sir; I recollect that day; I recollect the smell.

Q. Was the wind blowing from Barren island that day?

A. I think it was; directly the factory was called to my attention they said the smell comes from Barren island; I said I smell a smell, but I don't know what it comes from; I was there in June; Mr. Fairchilds told me to go to the island with him; I said I would; I went with him.

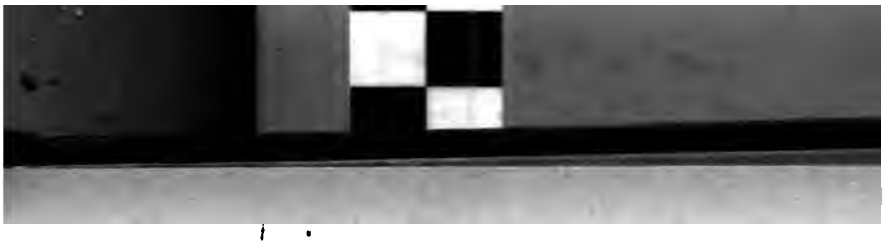
Q. What was the first factory you visited on that occasion?

A. I think it was Coe's; I am not certain about it.

Q. Did you meet Mr. White down there that day?

A. I think I did.

Q. You were in Coe's fertilizer factory?



A. All through it.

Q. How about odor?

A. I smelled no odor; there was a smell there of course.

Q. Did you see any piles of fertilizer there?

A. I don't think I did; I saw the ingredients.

Q. Any powdered fertilizer?

A. I don't know.

Q. Were they mixing while you were there?

A. I think not.

Q. Any sludge acid about?

A. I don't think the works were in operation.

Q. Were there any barrels of this stuff there?

A. I didn't see any.

Q. Mr. Holland says he smelled something like kerosene oil; did you detect anything of that kind?

A. I can't say I did; I will say I did not.

Q. There was no smell at all?

A. I didn't say that; there was a smell and I say that there was not an unpleasant smell there.

Q. Was it strong?

A. I didn't smell anything very strong there.

Q. It would not discomfort you any to have that smell go in your windows?

A. Not in the least the day I was there.

Q. After getting through with Mr. Coe's factory where did you go?

A. To Mr. White's factory.

Q. Did you skip the two fish factories?

A. I did not; I did go to the fish factories: I think to one.

Q. Was the business working while you were there?

A. There were men there; they were not boiling fish; I think it was Wednesday.

Q. Coe's factory was not working?

A. They had some men there.

Q. When was that?

A. It was in the latter part of June or the first of July.

Q. There seemed to be a cessation of business?

A. Yes, sir.

Q. Not boiling any fish?

A. No, sir.

Q. Any scrap on the platform?

A. Yes, sir.

Q. What sort of a day was it?

A. Pleasant day, a sunny day.

Q. Was it pleasant the day before?

A. Yes, sir.

Q. Did this scrap make any unpleasant odor?

A. More so than at the other factory, but nothing objectionable to me.

Q. Did you notice whether any of this scrap was rotten?

A. I did not.

Q. Did you take any of it up in your hands?

A. No, sir.

Q. Did you notice whether there were maggots in it?

A. It lay outside; I did not go up to it; I was up on the platform in the factory.

Q. Well, you didn't think that smelled bad?

A. It did not the day I was there.

Q. It was perfectly pleasant?

A. Nothing unpleasant; of course, there was more or less smell of fish.

Q. Was there a strong smell of fish?

A. There was, certainly.

Q. A *strong* smell of fish?

A. I would not say there was a *strong* smell; there was a smell of fish; I won't say it was strong.

Q. Did you meet any of the employés or superintendents of the fish factory while you were there?

A. No, sir; I saw men around there, but I didn't speak to them.

Q. You passed down to Mr. White's factory, the horse factory?

A. Yes, sir; and went through it.

Q. Any unpleasant smell there?

A. Not that day; it smelled like grease and such stuff.

Q. Any dead animals there that day?

A. No, sir.

Q. Were they working there that day?

A. There were some men around there.

Q. Were they cutting up dead animals?

A. No, sir.

Q. Did you go up to the cutting-up room?



A. Yes, sir.
Q. Any smell there?
A. Nothing disagreeable there.
Q. Did you go into the pig-pen?
A. Yes, sir.
Q. No disagreeable smell there?
A. Not at all.

Redirect examination:

Q. Are you not a member of the board of health of the town?
A. Yes, sir.
Q. How long have you been so?
A. About two years, I guess.

JOHN W. DUMONT, being duly sworn, testified as follows:

Q. Where do you live?
A. At Rockville Centre.
Q. Are you a member of the board of health of the town?
A. Yes, sir.
Q. How long have you resided there?
A. Thirty-four years.
Q. You are a justice of the peace?
A. Yes, sir.
Q. Did you go down with Judge Hewlett to the factory, to Barren island?
A. I did.
Q. Did you go through them?
A. Yes, sir.
Q. Through the factories of Coe and White?
A. Yes, sir.
Q. That was in June, I think?
A. About the first of July.
Q. Since that day, have you traced any offensive odors or noisome smells from Barren island?
A. I have not.

Cross-examination:

Q. You say you have not traced any smells, squire?
A. Yes, sir.
Q. Have you ever heard that there were smells from Barren island?

A. Yes, sir.

Q. Have you ever smelled Barren island?

A. Ten years ago when I was on Rockaway Beach I used to get odors from it.

Q. Were you engaged on Rockaway Beach at one time?

A. I was boarding there one season.

Q. The smells there they said came from Barren island?

A. Yes, sir.

Q. Do you remember how the wind was blowing on those occasions?

A. I think the wind was westerly.

Q. You went down at the invitation of Mr. Fairchilds?

A. I went down at the invitation of Justice Hewlett.

Q. You live at Rockville Centre, how many miles from Barren island?

A. Ten or twelve miles.

Q. You are in business there?

A. Yes, sir.

Q. I suppose you don't undertake to say whether there are smells at Rockaway Beach from Barren island or not?

A. My business calls me to Rockaway Beach part of the time; I have not detected any smell there during the last two years.

Q. When did you go?

A. I went during the month of August; I was there every morning.

Q. What was your business there?

A. Holding court.

Q. Do you recollect the wind on any particular day?

A. There were various winds.

Q. And you never noticed any smell from Barren island?

A. I think not.

H. T. VAN NOSTRAND, being duly sworn, testified as follows:

Q. Have you ever visited Barren island?

A. Yes, sir.

Q. How did you come to go there?

A. I went down to look after coal; I am in the coal business.

Q. When was this?

A. The last time was about a year ago.

Q. Did you go through Mr. White's factory?



A. Yes, sir.

Q. Were you there when a boat-load of horses was being received?

A. Yes, sir; I saw the horses taken off the boat; I don't recollect of seeing any taken and cut up and put in the vats.

Q. What was the condition of the place?

A. Very clean; surprisingly so.

Q. No unnecessary odor?

A. No, sir.

Cross-examination:

Q. What do you mean by unnecessary odors?

A. Nothing that would be offensive.

Q. How many dead animals were taken from the boat?

A. I did not count them.

Q. What were they?

A. Dead horses.

Q. Any cows?

A. I could not say.

Q. Nothing besides dead horses?

A. I could not say; I saw them taken off the boat.

Q. Did you see any entrails of animals or refuse of slaughter-houses taken off?

A. No, sir.

Q. Any garbage?

A. No, sir.

Q. All you saw was dead animals?

A. Dead horses.

Q. How close were you to them?

A. Between twenty-five and thirty feet.

Q. Still you say there was no offensive odor?

A. No, sir.

Q. None at all?

A. Some.

Q. But it was not offensive?

A. No, sir.

RUDOLPH G. SOLOMON, being duly sworn, testified as follows:

Q. What is your business?

A. I am a tanner; my business is that of tanning alligator skins, kangaroo skins, porpoise skins, horse hides; I am con-

sidered to be the largest tanner in the world; that is, my practice is very large; my business extensive; I get horse hides from Russia, England, St. Petersburg, Sweden, Norway, Denmark, Belgium, France, from Australia, China, Japan; indeed, you may say, from all over the world.

Q. You have visited many factories where horses were rendered and the hides taken off?

A. Since the early days of my business I have visited establishments, rendering companies, such as you call them — some call them fertilizer companies, some rendering companies — where dead horses are skinned and different parts of the horse are taken for different uses; to extract oils, to sell bones for making different articles which are called for in the commercial routine; I have visited in my journeying the establishments of Amsterdam, Brussels, Paris, London, Birmingham, Liverpool, Vienna, and in this country, that of Mr. White of New York, and all the establishments in Boston, Philadelphia, Baltimore, Cincinnati, Buffalo, Chicago, St. Louis and many other manufacturing cities.

Q. How recently were you at Mr. White's?

A. I think it was during last August; during the height of the season.

Q. How do the processes of Mr. White's and how does the establishment compare with the others you have mentioned.

A. I want to say that I have visited such establishments with more or less prejudice; on the day that I visited Barren island establishment I left one of the best hotels in Long Branch; my good wife saw me to the train and I said to her that I presumed my appetite for supper would not be quite as good as it had been for breakfast; she asked, "Where are you going?" I said, "I am going to visit some establishments on Barren island," and my experience in similar cases had shown me what to expect; I met Mr. White and we took a boat to the place in Canarsie; took a little tug there, and while we were approaching the island I made the inquiry how far the distance was from the mainland and from the island; I was informed; as the wind came towards us I expected presently a dose would come to me; as we neared the island I was much pleased to find the offensive odor which I dreaded to be missing; I had heard and read in the newspapers a good deal in regard to the establishment on Barren island, and for that reason I may say that I came there greatly prejudiced,



as I have stated; when I came to the island we found the boat with dead horses and other animals on it; some of the horses had been removed — taken up into the cutting-room; I found there to my astonishment that there was not any of those insects or mosquitoes; there were none there; I found the floor well wiped and plenty of water there; even between the boards I found that all the blood and offensive parts which decompose generally were well scraped away; I found that after the hide was taken off it was immediately washed — lowered into the water and washed and salted so that the blood on the hide could not decompose; I found the intestines removed from every horse and separately thrown into the car or wagon to be removed; and I found, upon looking through the establishment, that the kettles in which the grease is boiled were hermetically closed so that no odor could escape from them; and being shown through by Mr. White and coming with prejudice, I expressed my surprise that I had never visited in many years' traveling an establishment which was so well kept; I wore patent leather shoes, and when I left I found that the brim of the sole was just as clean as it was when I entered the factory.

Cross-examination:

Q. Which part of the sole do you mean?

A. What I mean is, being 225 pounds in weight, when I step into dirt generally I make the sole quite dirty.

Q. You have visited a large number of those kind of establishments?

A. Yes, sir; it is my business.

Q. You are accustomed to go into them?

A. Yes, sir.

Q. As a general rule they did not smell very well?

A. I have seen establishments that were well kept and I have seen establishments in which cleanliness was not only secondary but was below zero.

Q. Were you up in the cutting-up room while they were chopping up horses?

A. I was in every department; I was there when they were cutting up horses.

Q. The blood, etc., which comes from those animals was on the floor at the time?

A. The blood of those animals becomes very stagnant after a horse is dead for many hours; it does not run freely; there is apt to be a drop of blood out of the main blood vessel; but I have seen the blood washed away.

Q. Was there blood on the floor before it was washed away?

A. As the hide is taken off on Barren island it is so taken off as to make a kind of blanket to take the drippings that come from the carcass; then the hide is washed, and in that way the blood that would run out of the animal is disposed of.

Q. Where do they wash them?

A. They run them down from the second floor into the sea and there they are washed and come out clean.

Q. Did you see many of the hides washed in that way, while you were on Barren island?

A. I saw two or three hides washed.

Q. Do you understand that that was the usual method of cleansing the hides?

A. That I don't know.

Q. How did you get the light while you were in the cutting-up room?

A. I don't precisely know which way the factory is situated; I should say that the windows in the cutting-up room are at the Long Island side; the doors were wide open and I think the windows also.

Q. When were you there?

A. About the first of August; I can not say precisely; I think it was the first week in August.

Q. Did you notice the ceiling in the room, the lattice work on top?

A. I could not say that I did.

Q. Did you notice whether it was open or not?

A. I could not say.

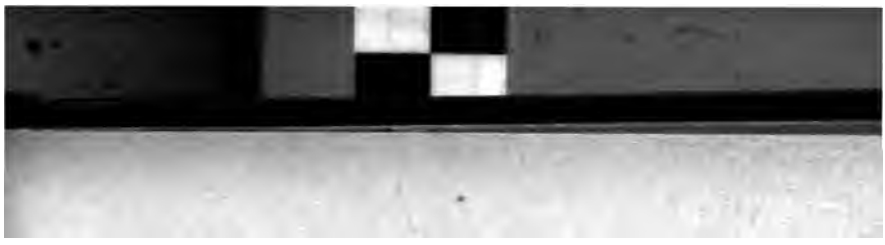
Q. I presume you know, and that you don't say that dead horses would not smell; is there any doubt in your mind whether dead horses smell or not?

A. There is not much smell to a dead horse.

Q. The same is true with respect to other dead animals?

A. The same.

Q. You don't think there would be any offensive smell from a dead cow?



A. Not for a few hours; decomposition has not set in.

Q. How long would you say an animal could be dead without smell?

A. Say within twenty-four hours; it depends upon the time of year.

Q. This was August?

A. Yes, sir.

Q. Was there any offensive smell from these animals that you saw?

A. No, sir.

Q. No offensive smell in the cutting-up room at all?

A. No, sir.

Q. Nothing that you would call offensive?

A. Nothing.

Q. Any smells?

A. No other than the smell peculiar to the oil and the meat.

Q. How many dead animals?

A. I could not tell distinctly; thirty-six or thirty-seven.

Q. Did you visit any other factories on the island?

A. I did not.

Q. Did you go to the fish factory?

A. It was pointed out to me.

Q. Did you get a smell from it?

A. There was a fish smell; it was not any more than I would find from fish in general.

Q. You think there was some smell from it?

A. There was a fish smell; that is natural to fish, but not offensive.

Q. You did business with Mr. White's establishment?

A. I do with all the establishments of that kind in the country.

Q. You buy hides from them?

A. I buy hides and get some of the oil, too.

Q. You are constantly doing it?

A. Yes, sir; with every establishment.

Q. I understand you to say that Mr. White's is the cleanest one of all?

A. I have never visited an establishment in this country as clean.

Q. You say you stood in the room where they were cutting up thirty-six dead animals and there was no smell?

A. Yes, sir.

Redirect examination:

Q. Were there disinfectants?

A. Yes, sir; I may say the first indication of decomposition sets in on the skin, more particularly the skins of animals having heavy hairs; the albumen of the blood forms a clot that binds the hair to the hides; if the hide has not been taken off from what we term fresh animals I would naturally see them; I could point out to you what establishment is more careless in this respect by the character of the hides.

Q. You didn't notice disinfectants were used?

A. I noticed that some disinfectants were used, but I could not say which.

VOORHEES OVERBAUGH, being duly sworn, testified as follows:

Q. Where do you reside?

A. In the town of Flatlands.

Q. How long have you lived there?

A. Ever since 1845.

Q. How far is Flatlands from Barren island?

A. From where we reside about three miles.

Q. You are at present school commissioner?

A. No, sir; I have filled that office, but I went out of office three years ago.

Q. Have you been a member of the board of health there?

A. I have.

Q. How many years ago?

A. About five years ago.

Q. Have you noticed any nauseating or offensive smells from Barren island?

A. Not recently.

Q. Do you own property in Flatlands?

A. Yes, sir; a small property.

Q. Have you ever visited Barren island?

A. I have as a member of the board of health and as school commissioner.

Q. You say you visited it officially as school commissioner and as a member of the board of health?

A. Both.

Q. You went to the factories as a member of the board of health?

A. Not through the factories as a member of the board of health; there was a complaint made that they were dumping, and we found it was untrue; I did not visit it officially only, to detect the fraud.

Cross-examination:

Q. What year were you there?

A. Five years ago, I think.

Q. Is it five years since you have been a member of the board of health?

A. Yes, sir.

Q. What other members of the board of health were with you?

A. The supervisor, Judge William Thomas and Judge Ditman.

Q. Was Williamson one of the board?

A. No, sir, not then; Judge Savage was.

Q. That was five years ago?

A. Yes, sir.

Q. How long had you been in the office as member of the board of health?

A. I only served two years.

Q. Do you remember getting any complaints against Barren island during 1884?

A. There were no complaints against Barren island during my membership of the board.

Q. Do you remember complaints of the Manhattan Beach people?

A. No, sir, I was not in office at that time.

Q. How near to the water are you at Flatlands?

A. About a mile perhaps.

Q. Do you know where Bergen island is?

A. Yes, sir.

Q. How far are you from it?

A. From my place of residence to Bergen island, about a mile.

Q. How far from Barren island?

A. About three miles.

Q. Do you know what direction?

A. I should think Barren island was perhaps east of southeast.

Q. Do I understand you to say that you never have smelled an odor from Barren island?

A. I have not smelled it the present year.

Q. How about last year?

A. I don't remember particularly about last year; I remember some five or ten years ago it was very offensive, but since then it has improved.

Q. Do you remember in 1888 the odor was very strong from it?

A. No, sir; I didn't notice.

Q. Did you go through the factories five years ago when you were there?

A. Yes, sir; and the nineteenth of September of this year I was over there visiting the school; I went through all of them.

Q. How about the smell on the nineteenth of September?

A. It was not offensive at all.

Q. Did you go through Mr. Coe's fertilizer factory?

A. Yes, sir.

Q. Were the fertilizers there?

A. Yes, sir; piled up in heaps; there was some smell, but not very offensive; I would not say there was none at all.

Q. You would not want to smell it all the while?

A. After you smelled it a little while you would not know of it.

Q. Did you go through the fish factory?

A. Yes, sir.

Q. Was it very hot?

A. Not very hot.

Q. Did you see them have any scrap out on the platform?

A. No, sir; not then.

Q. Were they boiling fish?

A. No, sir.

Q. You came down to Mr. White's?

A. Yes, sir.

Q. Did you go through that place?

A. Yes, sir; we didn't go up on the second story; we stood on the wharf where they were raising the dead animals up.

Q. Was there any smell from the dead animals?

A. There was a little.

Q. Not offensive at all?

A. No, sir; I should say not; I would not want to smell it all the while.

Q. You don't think the dead horses were offensive at all?

A. No, sir; there had been a fire in New York and some of them had been burned.

Q. Even after burning there was no smell?

A. There was a little smell, but not very offensive.

Q. Did you go into the place where they kept the pigs?

A. Yes, sir.

Q. Was there any smell there?

A. Very little; nothing more than in any pig-sty around your door; there was some smell, but it was not offensive at all to me; we had several ladies with us and it was not offensive to them.

Q. Do you mean to say that those smells are not carried on the wind?

A. They are carried on the wind, but I have not smelled them this summer because there has been a great improvement.

Q. The day you were there at the factories were any working?

A. No, sir.

Q. How did you come to be here to-day?

A. I was requested through Mr. Coe to be here.

Q. Have you any business dealings with him?

A. No, sir; I don't know that I have ever spoken with him; somebody told me Mr. Coe wished me to come down.

Q. What is your business?

A. I am a teacher.

Q. Have you been a teacher on Barren island?

A. No, sir.

Q. Any connection with that school at all?

A. Not now; I had at the time I was commissioner; I visited it on September nineteenth to make a friendly visit to the school; all the clergymen, the people and ladies took a trip to Barren island, and were very much pleased, indeed; they never complained of anything offensive; they went through the place; the workmen led us through; excepting the particular place where they cut up horses, it was as clean a place as I ever visited of that kind.

Adjourned till Tuesday morning, November twenty-fifth, at 10 o'clock.

November 25, 1890.

The committee met pursuant to adjournment.

Present.— Hon. Thomas Newbold, Dr. F. O. Donohue and Dr. Lewis Balch, secretary.

GEORGE D. MCCARTHY, appearing for the heirs of James Schenck, deceased, stated that he had a material and necessary witness,

Dr. Allen, health officer of Flatlands, who promised to be present, but who had failed to keep his promise. Dr. Allen had visited Barren island and had made a report thereon to the town board of health of Flatlands. He wished to apply to the committee for a subpœna compelling his attendance under the provisions of chapter 270, Laws of 1885, as amended.

The defense objected to this, as his evidence was only cumulative. It was finally determined to issue the subpœna not only for Dr. Allen, health officer, but for all the members of the board of health if desired by either side.

Mr. KELLY.—Since the last hearing I have received a number of communications from gentlemen residing in the vicinity of Rockaway Beach, who desired to be advised of the date of your session, stating that they wanted to come before you and testify. I have replied to them all that you would be here this morning and told them to be present. If they are here they can now make their own statements. They are not witnesses summoned by me, but persons who have heard of the investigation and inquired about it.

Mr. McCarthy then called his witnesses.

NICHOLAS R. SCHENKE, sworn for the plaintiffs, examined by Mr. McCarthy:

Q. Where do you reside?

A. At Canarsie.

Q. How long have you resided at Canarsie?

A. Nearly sixty years.

Q. You are an owner of real estate there?

A. Yes, sir.

Q. You are one of the Schenke heirs?

A. Yes, sir; of James Schenke, deceased.

Q. About how far is Barren island from Canarsie?

A. From my residence it is about four miles.

Q. Have you ever been on Barren island?

A. Very frequently.

Q. You know the situation and location of these factories?

A. Yes, sir.

Q. When the wind is in a southerly direction, blowing from Barren island toward Canarsie, do you smell any odors?

A. Yes, sir; plenty.



Q. Are they agreeable or disagreeable?

A. Very disagreeable.

Q. What effect, if any, do they produce upon you?

A. Well I can bear it about as far as here (pointing with his finger to his wind-pipe) not half way down my lungs; it then sickens my stomach so that I can't dine; farmers dine at noon usually, and it is about that time the odor strikes in for business, strong business.

Q. You mean a disagreeable smell?

A. Yes, sir; undoubtedly.

Q. Does it interfere with the enjoyment of your premises?

A. Yes, sir.

Q. With your comfort within your own house?

A. Yes, sir.

Colonel Prentice submitted that this form of questioning was very difficult to follow with a man that was deaf.

Q. How often do you have these odors?

A. Not frequently this time of year, but in March, April, May and June with a south and southeast wind we have them every day, night and day.

Q. The odor is brought usually upon a south wind?

A. Southerly to southeasterly wind.

Q. What is your business at Canarsie?

A. Nothing, except fishing for my own amusement.

Q. Have you planted oysters?

A. Not this year; I have not within two years.

Q. When you got oysters did you observe any effect upon them?

A. The oyster was flavored with this odor.

(Objected to.)

Mr. McCarthy intended to establish that the industry of the town was affected by these factories, that the growth of the oyster and its flavor was affected, and that the business of the oystermen had decreased by reason of the business of those factories.

Judge JORALEMON.— The best proof is the oyster itself; let us have that.

Q. Were your oysters ever affected?

A. Yes, sir.

Q. What affected them to your knowledge; what do you think?

(Objected to what he thinks.)

A. Sludge acid or tar.

Q. This sludge acid is deposited in the bay?
A. Yes, sir.
Q. Deposited upon the water?
A. Yes, sir.

By Dr. BALCH:

Q. When was that, sir?
A. In the years 1888 and 1889.
Q. Has it been this year?
A. No, sir; I don't know anything about this year.
Q. Do you know whether sludge acid is now discharged into the water at Barren island?
A. Yes, sir; they have a coffer dam and they discharge it into the bay.
Q. Does that affect the oysters?
A. I can not say.

Direct examination resumed:

Q. You have fished in the bay?
A. Yes, sir.
Q. In the neighborhood of Barren island?
A. Yes, sir.
Q. Were you affected by these nauseating smells?
A. I think so.
Q. What was the effect?
A. The odor was so bad that I had to leave.

Cross-examination:

By Mr. PRENTICE:

Q. Has any sludge acid been discharged into the bay this year?
A. I am sure I can not tell; the sludge acid comes floating on the water; I can not tell where it comes from.
Q. Have you any evidence that in any year 100 pounds of sludge acid was deposited in the bay from the coffer dam from Barren island?
A. Yes, sir.
Q. State what the evidence is?
A. I was one time at Coe's factory, on their dock, in 1888, and I saw the sludge acid tank-boat come; Mr. Seifert, the former foreman, said, "I can not handle this acid," and they went out in the middle of the channel and opened the tank and let her drift.

Q. Mr. Seifert did it?

A. Yes, sir.

Q. Is that the only time of which you have any evidence?

A. I have seen it frequently; I can not give the times; I didn't take the trouble to keep a memorandum.

Q. Can you recall any other scene?

A. I saw them discharge it on the salt ponds; they are filled with it.

Q. Is there any sludge acid in any salt pond on the island now?

A. Yes, sir; a million barrels, probably.

Q. Where is it?

A. Right in the center of the island.

Q. Has it been so this year?

A. It has been so ever since.

Q. What time did you see it last?

A. About May last.

Q. Are you aware of the fact that the use of sludge acid has been entirely discontinued on the island for two years?

A. No, sir; they can not discontinue it, because the acid is still there and it will never get off in God's time unless you move the island.

By Mr. CANTOR:

Q. Do you live down there with your family?

A. Yes, sir.

Q. How many years have you lived with your family in Canarsie?

A. Sixty years.

Q. Your family have enjoyed pretty good health?

A. No, sir, not at all.

Q. Which members have been sick?

A. It cost me $1,000 one year for them.

Q. Which members of your family?

A. The members.

Q. Which members?

A. All the members; seven grandchildren at one time were sick in the house.

Q. They were all sick through Barren island?

A. I suppose so; it was charged to Barren island.

Q. But you can not tell; how can you tell?

A. The air coming from there; the stench coming from there; the house is impregnated with it; you had to close the windows and stay in the house; it was sludge acid and filth.

HOMER F. CANDEE, sworn for plaintiffs.

By Mr. KELLY:

Q. Where do you reside?

A. At Rockaway Beach.

Q. What is your business?

A. Teaching; I am principal of the Rockaway Beach public school.

Q. Where is it located?

A. About along the center of the village.

Q. How near to the land is the Rockaway Park Improvement Company?

A. About one mile to the eastward.

Q. Do you know where Barren island is?

A. I do.

Q. How long have you known Barren island?

A. I have known it for a number of years; I have lived on Rockaway Beach only four years; when I lived at East Rockaway and Rockville Center I knew of it by the scent.

Q. Had you experienced any disagreeable odor from the direction of Barren island when the wind blows from that quarter?

A. Very much, sir; I have been interested more particularly on account of my school in the months of September and May and June, when we keep the windows up; our children many times have been panic-stricken and almost obliged me to dismiss school on account of the nauseating and sickening smell.

Q. Did you ever know of this smell producing sickness?

A. One of my teachers was sick from that cause for over a day; my children have said when leaving the school yesterday — I asked my class about the smell; I told them I threatened to come down here —

(Objected to what the class said; withdrawn.)

Q. Can you see Barren island from your school?

A. I can by going upon the building.

Q. Is this smell experienced at the time the wind blows from Barren island?

A. Yes, sir.

Q. At any other time?

A. No, sir,

Q. Is there anything between Barren island and your school to produce the smell?

A. No, sir.

Q. Whereabouts is your school?

A. On Rockaway Beach, near Holland station; about a quarter of a mile from Seaside; about three-quarters to half a mile.

Q. How far from Barren island?

A. I could not tell; I should think about two or three miles.

Q. You say in September, May and June you have the smell?

A. We have it at other times of the year, but more particularly then on account of the windows being up, on account of the wind's direction; we do not have school in July or August; we experience a great deal of trouble, principally in May and June, on account of having the windows up.

Q. How many children have you in attendance on the average?

A. We have now 170.

Cross-examination:

Q. You say you smell this odor at other times of the year?

A. Yes, sir; certainly.

Q. And in the winter, too?

A. Yes, sir.

Q. When the wind is from that direction?

A. Yes, sir.

Q. It is about the same kind of a smell?

A. Yes, sir.

Q. So far as the children are concerned, it annoys them most in the months of September, May and June, when the windows are up?

A. Yes, sir.

Q. You yourself smelled it during other seasons of the year?

A. Yes, sir.

Q. Winter and summer whenever the wind was in that direction?

A. Yes, sir.

Q. The same smell in winter as in summer?

A. Yes, sir.

By Mr. PRENTICE:

Q. In what direction is Barren island from your school?

A. I should think from the points of the compass it was a little north of west, not much, nearly west.

Q. Which way did the wind blow yesterday?

A. I think the wind blew southwest.

Q. Is it not a fact that it was almost directly south yesterday?

A. I could not say.

Q. You say yesterday you had the same smell?

A. I did not say I had any smell yesterday; I did not say that.

Q. Can you mention any day within a period of four months when you had a smell from Barren island.

A. No, sir.

Q. Do you know Mr. Williamson?

A. Yes, sir; I met him for the first time to-day; I have heard of him before, but never saw him that I remember.

Q. Do you know any of the managers of the Rockaway Park Improvement Company?

A. I know none of them.

Q. Have you talked of your impression of the origin of these smells with anybody?

A. After the commission met the first time, and my neighbors were coming down to testify—

Q. Have you talked with anybody?

A. I have not; only just that I wished to come down and testify; that is all.

Q. You had a very strong impression on your mind that the cause of these smells was Barren island?

A. I think I had.

Q. Can you imagine any other cause for these smells?

A. No, sir.

Q. Have you been on Barren island?

A. No, sir; I have been by it.

Q. You have no personal knowledge, then, of what is on Barren island?

A. I have smelled it on going by there.

Q. How far away from Barren island have you smelled it?

A. I have passed through the inlet; passed down through Canarsie, and down through there.

Q. South and west?

A. Southwest and east; nearly east.

Q. Have you been to visit the school on Barren island?

A. No, sir.

Q. Do you know whether there is a school there or not?

A. I do not.

Q. Have you never heard that there was a public school of sixty or more scholars on Barren island?

A. I have not.

Q. Besides your own impressions of the annoyances to the scholars in your school, have you heard of any annoyances or complaints from any other school?

A. No, sir.

Q. Are you aware of the fact that teachers of schools from your vicinity made a visit and inspection of the Barren island school in the summer of 1890?

A. No, sir.

Q. Are you aware of the fact that the reports of school inspectors on the condition of the school and the health of the scholars on Barren island have been made and filed this year?

(Objected to. The reports should be submitted. Question allowed.)

A. I did not know it.

Q. Under whose directions is your school?

A. Under the special direction of a board of trustees; we are in the town of Hempstead, in the school commissioner's district, second district, under James B. Curley.

Q. Have any complaints ever been made to the board of health of Hempstead from your school?

A. I don't think there have directly from me.

Q. Have you ever made any official report to any health authority of any nuisance on Barren island?

A. No official report; I spoke to Dr. Hutchinson last summer concerning it; he is one of the health officers; he is one of the members of the board.

Q. Will you give me his full name?

A. I can not.

Q. Where is he to be addressed?

A. At Pearsalls; I think his name is James.

Q. You have never then felt it your duty to make any official report about the health of your school as affected from any nuisance from any quarter whatever?

A. I felt like it a great many times, but I did not know what course to take; I did not suppose it would make any difference; I did not suppose making a complaint to the board of health would

have any effect whatever; my wife and I have experienced it in our school, and several others have and stated that the nuisance should be removed; it was an annoyance to us for the last year.

Q. Is there not within a radius of four miles from your place a number of factories where petroleum is used and fish are boiled?

A. I do not know of them.

Q. Do you know of any factory near Auvergne?

A. No, sir.

Q. Do you know of any factory in Jamaica?

A. No, sir.

Q. Nor any in Flatlands?

A. I do not know of any.

Q. Do you know whether there is any factory in Fosters meadow?

A. I do not.

(Mr. Kelly objected to this evidence as immaterial. The places are miles away from the locality in question. Flatlands is the other side of Jamaica bay.)

Q. Did you come from Rockaway Beach this morning?

A. Yes, sir.

Q. Any smell this morning?

A. I came away quite early; I didn't notice any.

Q. The wind was directly south this morning?

A. I don't know.

Q. Was it southwest?

A. I don't know.

Q. Describe more particularly this offensive smell that you think you have noticed; what is it like?

A. I could not tell you, only it is sickening and nauseating; it will cause a person to —

Q. Describe more particularly this smell?

A. I can not describe it more than I have; I can tell the effect of it; it is sickening.

Q. Are you a doctor?

A. I am not.

Q. Are you a chemist?

A. I am not; I teach it some, and I teach physiology some.

Q. You have no idea from any personal knowledge what is the cause of, or from what processes would result the offensive smell you think you have noticed?

A. No, sir; it stinks, that is all.

Q. To your nose and your mind all stinks are alike?

A. No, sir; there is this and that that are not sickening and others that are.

Q. According to your theory all sickening smells are alike?

A. No, sir, they can not be described.

Q. There is nothing by which you can distinguish this smell?

A. I don't know how you can go to work and describe the smell; they are near alike and both sickening; you can not understand the chemical composition; no nose will do that.

By Judge JORALEMON:

Q. How near to the beach is your school, to Rockaway Beach?

A. It is right on the beach; it is 300 yards from the ocean.

Q. How near to Wainwright's?

A. Probably three-quarters to half a mile.

Q. The tide in the rear of Rockaway Beach ebbs and flows?

A. Yes, sir.

Q. Don't you get considerable smell from that?

A. Not one particle; it comes into our cellar and our basement and there is not a particle of smell.

Q. What is the name of the first house at the boat landing?

A. Brosnells.

Q. Did you mean to say to this committee that when the tide is out at that point it does not smell badly?

A. It has a salty smell as all seaside places have, but it is not offensive.

Q. A very strong fishy smell?

A. I have not smelled it.

Q. Did you have a nose on you then?

A. Yes, sir; just as good a nose as when I smelled the other.

Q. You now say, upon your oath, that in the spring and summer seasons, when they are gathering fish and oysters at that point, that you do not smell a strong, offensive fish smell along the shore?

A. They remove that and bury them before they smell.

Q. I ask you if you state to this committee that in the spring and summer seasons, when they bring in the fish and oysters all along that shore, if you do not smell a strong, offensive fish and oyster smell along there?

A. There is no offensive smell; there is a smell, but it is not offensive.

Q. Is it a fish smell?

A. I can smell a fish smell as I can right under my nose; I smell it when I am in the fish market.

Q. Is not that shore there all along a black mud?

A. No, sir; not all along; it is not.

Q. Mostly all along?

A. No, sir; it is gravelly.

Q. There is a salt meadow channel running along there?

A. I don't know what you mean.

Q. Where the boats go up back of Rockaway Beach?

A. The boat goes up the Jamaica bay.

Q. What is the channel in the rear of Rockaway Beach along where Seabright hotel and other landings are?

A. There is none there; you are thinking of another place.

Q. The channels of the steamboats from New York city going up in the summer time?

A. It is built all along there; there are docks along there; no channel only a little curve around the land; they are built out in the bay — in Jamaica bay.

The committee adjourned to continue the hearing at the Sixth Judicial City Court.

DANIEL V. ARGUMBAU, sworn for the defendants:

Q. Where do you live?

A. At 88 Second place, Brooklyn.

Q. Where is your summer place?

A. At Wave Crest, Far Rockaway.

Q. Will you tell where it is and what sort of a place it is?

A. It is a place of fine residences.

Q. How long is it since it sprung up?

A. I suppose within the last ten or twelve years.

Q. It is a place of summer resort for people from what cities?

A. They come from Brooklyn and New York, and I guess from every quarter.

Q. Have improvements gone on rapidly within the last two or three years?

A. Yes, sir.

Q. Were you there constantly last year?

A. I was there last year from the first of May to the first of October.

Q. Do you know where Barren island is?

A. I do.

Q. Were there at Wave Crest any offensive odors or disturbing influences from Barren island?

A. Not to me.

Q. You are a family man?

A. Yes, sir.

Q. Were they offensive to any of your family?

A. No, sir.

Q. The direction of Wave Crest is about west?

A. About west of southwest.

Cross-examination:

By Mr. KELLY:

Q. Mr. Argumbau, Wave Crest is between Far Rockaway and Long Beach?

A. I think not; I think Wave Crest is Far Rockaway; it is the southern part.

Q. As you go along the ocean front Wave Crest sets to the east of Far Rockaway station?

A. No; it stands, I think, south of Far Rockaway station.

Q. As you go from Rockaway Beach to Wave Crest don't you pass through Far Rockaway?

A. Oh, yes, sir.

Q. How many miles is your residence from Far Rockaway station?

A. Only about a quarter of a mile from Far Rockaway station.

Q. How near are you to Lawrence?

A. A little over a mile.

Q. Is Lawrence further eastward?

A. Yes, sir; northeastward.

Q. Have you experienced any bad smell of any kind at Wave Crest?

A. Not a bad smell; I never experienced any.

Q. Did you ever get the smell from Barren island?

A. Yes, sir.

Q. Have you been near it?

A. Yes, sir.

Q. What do you say about the character of that smell?

A. I could not say much; it is a bad smell when you are near it; it is not a pleasant smell.

Q. Is it such a smell that if it entered into your place would be unpleasant?

A. I do not know; I have not had it enter into my house.

Q. If such a smell should enter into your house would it be a pleasant smell?

A. I can not say that; I know where I did have it it was not pleasant but I do not know about it in the other case.

Q. Wave Crest is nearer Barren island than Far Rockaway?

A. Yes, sir.

Q. How far is Wave Crest from Rockaway Beach — from what they call Rockaway Beach, where the crowd goes?

A. I suppose three and a half miles.

Q. Wave Crest, when was it established?

A. I could not say; I have lived along there for three years; I have been living in Far Rockaway five.

Q. During all that time you have not been annoyed by this smell from Barren island?

A. No, sir.

Q. Wave Crest is a new creation?

A. I could not say how long; I know it for eight or ten years.

Q. It has had a special development within the last few years for developing residences?

A. For the last two or three years.

Q. Lawrence is a place right next Wave Crest?

A. No, sir; it is farther down.

Q. That whole coast has been developed within the last two or three years as a summer resort for city people?

A. Yes, sir.

Q. There are fine residences there?

A. Some; the places are all contiguous with each other, Wave Crest, Lawrence and Auvergne.

Q. Have fine, costly residences been put up there in Lawrence and Wave Crest?

A. I think so.

By Mr. KELLY:

Q. How near were you to Barren island when you experienced this unpleasant smell?

A. About sixty or a hundred yards.
Q. Was the wind blowing toward you?
A. Yes, sir.

DANIEL D. LORD, sworn for the plaintiffs:

By Mr. KELLY:

Q. Where do you reside?
A. I reside at Lawrence.
Q. What is your profession?
A. I have been a lawyer, but I am not now in any profession.
Q. You own property at Lawrence?
A. Yes, sir.
Q. How long have you resided there?
A. Over twenty years.
Q. Are you familiar with the country about there?
A. Quite.
Q. Do you know where Barren island is?
A. Yes, sir.
Q. Have you ever experienced any offensive smell from Barren island?
A. I have, many a time.
Q. Please state to the committee your experience in that regard?
A. Generally when the wind is —

(Judge Joralemon wanted the witness limited as to time. The committee allowed the witness to make his statement.)

A. When the wind has been westerly I have almost always within two years noticed a very pungent, disagreeable odor from Barren island; the odor resembles somewhat some grade of kerosene, but it was a great deal more pungent and disagreeable; I have observed that smell only when the wind was westerly; except on rare occasions, when it came a little south of west; I have perceived that smell as far to the east as East Rockaway, and beyond and at East Rockaway it came almost as strong as at my place; it was one of the most disagreeable odors that I have ever smelled.

Q. Is there intervening between any manufactory of any kind between your residence and Barren island?
A. No, sir.
Q. Nothing else from which the odor could come from?
A. No, sir.

Cross-examination:

By Mr. PRENTICE:

Q. You are largely interested at Rockaway Beach, are you not?

A. Not a particle.

Q. Are you not interested in the Rockaway Beach Improvement Company?

A. Not in the least.

Q. Are you not prominent in the Long Island railroad?

A. No, sir.

Q. Have you ever seen the boats of the Standard Oil Company, which come in the neighborhood of New York, passing near Rockaway Beach?

A. Not to know them.

Q. Do you know whether, or not, sludge acid is thrown into the bay from the boats that come from the oil refineries?

A. I do not know; I should suppose that they would not go into the bay; it is out of their course.

Q. Is it not a fact that traces of sludge acid have been found on Rockaway Beach within the last two years?

A. That I can not say.

Q. Are you able to distinguish odors from the refuse of petroleum refineries from other odors?

A. Oh, very easy.

Q. Has it a petroleum odor?

A. It is an odor resembling petroleum.

Q. Is it more pungent or troublesome when mixed with water, this refuse?

A. That I can not tell.

Q. Have you used upon your lawn any fertilizer?

A. Yes, sir.

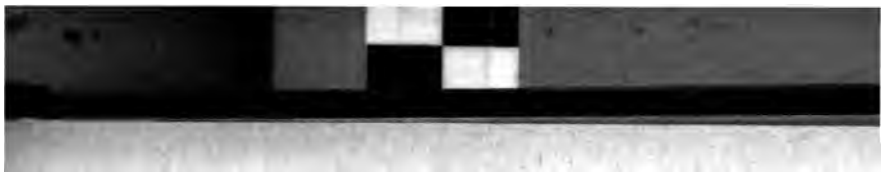
Q. The smell from the fertilizer that you used on your lawn, the time you used it, was it the same as you remarked as being offensive that you described in your testimony?

A. It was not.

Q. Then it has not the smell of fertilizer?

A. I don't know but what some fertilizers may have that smell, but it is not the smell of the one that I use.

Q. Have you ever heard or known of refuse from oil refineries here in New York being thrown into the water in the vicinity of New York?



A. I have heard of it.

Q. Within the last two years?

A. I can not specify within the last two years; I will not say that I have not heard of it within the last two years.

Q. Do you know, as a fact, whether or not sludge acid has been used on Barren island within the last two years?

A. I can not tell.

Q. Have you ever visited Barren island?

A. I have sailed past it, but I have not been on it.

Q. In the course of your acquaintance with this vicinity, has not real estate vastly increased in value and is it not constantly rising?

A. I believe it has.

Q. Within the last two years there has been considerable settlement there?

A. Yes, sir; there has.

Q. You say that the odors you have distinguished were more prevalent within the last two years, or previously?

A. Very much more prevalent previous to the last two years.

Q. There has been some abatement?

A. Yes, sir.

Q. At what season of the year have you noticed it?

A. Previous to the last two years I have noticed the odors both in winter and in summer; I think more prevalent during the winter than during the summer; for the last two years, and the winter before last; I think I smelled them occasionally when I was down at Lawrence, but I was not there frequently; last winter I was out of the country; I was away.

Q. Have you been in Lawrence within a week?

A. Yes, sir.

Q. How lately?

A. I left at 8.17 this morning.

Q. Last night you were looking for testimony on this matter?

A. Yes, sir.

Q. You passed along gathering witnesses?

A. Yes, sir.

Q. And you have taken quite a prominent part in this inquiry?

A. Not a very prominent part, for I had no notice of this meeting of what was going on until nearly 5 o'clock yesterday afternoon.

Q. Do you propose to introduce witnesses here?

A. I am not counsel for any of the parties, but I shall bring witnesses.

Q. When you were in that neighborhood yesterday, did you notice any of those smells that you complained of at Lawrence?

A. No, sir; the wind was northerly; it would not come from there.

Q. Did you notice any smell this morning?

A. I did not.

Redirect examination:

Q. Did you ever think that the smells from Barren island had anything to do with the increase in the value of real estate?

A. I think that they have depressed it; property would have increased more rapidly but for them.

Cross-examination:

Q. Are you interested in real estate in Lawrence?

A. Yes, sir.

Q. To quite a considerable extent, are you?

A. I have a place; I live there.

Q. How long have you been familiar with that region of Lawrence?

A. I think for over thirty years.

Q. You have been in the habit of going down there in summer?

A. Yes, sir.

Q. And stayed there occasionally in the winter?

A. I have occasionally been down for a day during the winter; my house is closed then.

Q. Two years ago you noticed the smell more distinct than at present?

A. Yes, sir.

Q. And previous years, prior to that you noticed it more distinct?

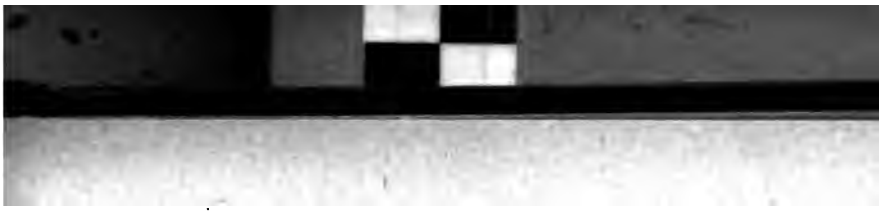
A. Yes, sir.

Q. When did this development of Lawrence as a summer resort take its main start; how many years ago?

A. I should say over ten years ago.

Q. Had it been developed to still further extent within the last three or four years?

A. I think not.



Q. Has it not within the last five years had its principal development?

A. If you mean by development having more houses, within the last five years more houses have been built; but the place is nearly filled up now and there is not much room for houses.

Q. The character of the residences put up there have been summer residences and country villas?

A. Yes, sir.

Q. They have been very costly?

A. Some of them are.

Q. Has there not been one put up there for Mr. Henry Wick?

A. Yes, sir.

Q. Supposed to cost about thirty or forty thousand dollars?

A. I don't know about that.

Q. Has not that residence been put up within the last four or five years?

A. Yes, sir.

Q. All this development has taken place during the time these odors were coming from Barren island?

A. Yes, sir.

Q. More offensively than during the last two years?

A. No, sir; some four or five years ago the odors were more constant than now, but not more offensive; within the last two years they have been diminished; I think Mr. Wick's house was built about three years ago.

Q. That whole coast has been developed quite extensively within the last four or five years?

A. There have been a great many houses built and people settled there.

Q. Fine country houses?

A. Yes, sir.

By Judge JORALEMON:

Q. When did you take up your residence at Lawrence?

A. I don't know; I am nearly the oldest resident.

CHARLES H. SARGOOD, sworn for the defendants.

Examined by Mr. PRENTICE:

Q. Where do you reside?

A. Three hundred and sixty Graham avenue.

Q. Are you a member of the club that has a house on Barren island?

A. Yes, sir.

Q. What is the club for?

A. For amusement, pleasure, fishing, gunning and one thing and another.

Q. Are you frequently there?

A. Yes, sir.

Q. Have you been there this summer?

A. Yes, sir.

Q. Have the members of the club, so far as you know, been annoyed by any offensive smells or odors?

A. Not to my knowledge.

Q. You have pretty good sport there?

A. Yes, sir.

Q. Which end of the island is this house on?

A. The west end.

Cross-examination:

Q. What is the name of the club?

A. The Nassau Fishing Club.

Q. Is it incorporated?

A. No, sir.

Q. How long has it been in existence?

A. Two years this April.

Q. Have you summer or winter headquarters outside of Barren island?

A. Only there.

Q. That is the place you go to for amusement?

A. Yes, sir.

Q. For gunning and fishing?

A. Yes, sir.

Q. You have a club-house there?

A. Yes, sir.

Q. How large is it?

A. Eighteen by twenty; one room.

Q. It is a frame building?

A. Yes, sir.

Q. How many members are there in the club?

A. Eight.



Q. Do you lease the land on which the club is located?

A. No, sir.

Q. By what right are you there?

A. That I couldn't tell you; one of the members got that right; I know nothing about it.

Q. Who did you get it from?

A. I don't know anything about it.

Q. Does Mr. White own the land on which the club is located? (Objected to.)

A. I don't know any one of them gentlemen.

Q. You don't pay rent for it?

A. No, sir.

Q. How often have you been down during the past summer?

A. I have been down two weeks at a time; I have my family there.

Q. How near is the club-house to the fish factory?

A. About half a mile west of the factories.

Q. Have you been down at the fish factories while they were operating?

A. I have.

Q. Have you seen them boiling fish there?

A. No, sir; I merely passed through there with my family.

Q. Were the factories working?

A. They were scattering round fish in their yards there; I saw fish spread out there in August.

Q. Was it a hot day?

A. Yes, sir.

Q. Did you go on the platform where the fish was?

A. I walked over it.

Q. Did you detect any odor from the fish?

A. Nothing more than a fish smell.

Q. Was it a pleasant smell?

A. It was not bad; I would not mind smelling it every day if I could stay down there.

Q. Did you notice if there was any of the fish decayed or rotten?

A. No, sir; I did not.

Q. Did you notice them boiling fish in vats?

A. No, sir; I did not.

Q. Did you see any steam coming from the factory?

A. I saw it coming from the engine pipe; I could not tell where the steam came from.

Q. After you brought your family through the fish factories did you visit the other establishments?

A. No, sir; I went there to visit the club-house.

Q. Have you been in Mr. Fairchild's place?

A. I do not know where it is.

Q. Have you been in the horse rendering establishment?

A. I have been in front of it fishing.

Q. Have you detected any unpleasant smell from either of those factories?

A. It never hindered me from eating my dinner there.

Q. Did you get any bad smell?

A. Not that I can say, truthfully.

Q. You have been pretty close to these places?

A. Yes, sir.

Q. The wind was blowing towards you?

A. Yes, sir.

Q. Have you ever seen what is known as the horse boat landing?

A. I have sailed by it and saw it there; never got any bad smell from it.

Redirect-examination:

Q. Have you seen any refuse tar, petroleum tar on the water while you were fishing around the island?

A. I don't know that I did.

Q. Near the island, have you seen any petroleum tar that was on the water floating?

A. No, sir.

Cross-examination:

Q. What is your business?

A. Taxidermist.

Q. You stuff dead animals?

A. I don't stuff dead animals; I stuff skins.

JAMES NEWTON, sworn for the defendants:

Q. Where do you live?

A. At 267 Perry street, Brooklyn.

Q. You are a member of the Nassau club?

A. Yes, sir.

Q. You visit that place of amusement and recreation?

A. Yes, sir; quite frequently.

Q. You were there this year.

A. Yes, sir; quite often.

Q. On Barren island?

A. Yes, sir.

Q. Has there been any trouble or inconvenience from the disagreeable odors there?

A. I have not experienced any, sir.

Cross-examination:

Q. Have you been through any of the factories?

A. Well, on the way from the steamboat only.

Q. How close did you come to them?

A. I have been through the yards where the fish was.

Q. Have you been there while they were boiling fish?

A. I don't know what you mean.

Q. You never saw them boiling fish?

A. No, sir.

Q. Have you seen fish scrap spread out on the platforms?

A. Yes, sir.

Q. Any bad smell from it?

A. No, sir.

Q. Any smell?

A. A little bit fishy.

Q. How about the other factories; was there any smell from them?

A. No, sir; I never smelled them at all.

Q. Have you staid there at night?

A. Yes, sir.

Q. While they were rendering animals?

A. Yes, sir.

Q. While the fertilizer factory was working?

A. Yes, sir.

Q. You never got any unpleasant smell?

A. No, sir.

Q. You fished all around Barren island?

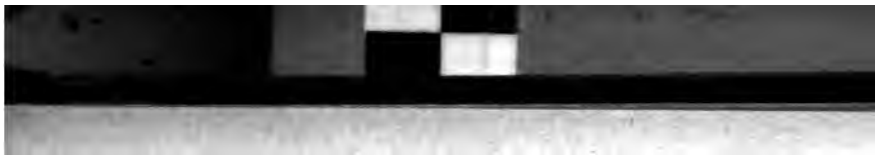
A. Yes, sir.

Q. How long have you been going to Barren island?

A. About two years.
Q. How old are you?
A. I am twenty-two years of age.

L. M. ALLEN, sworn for the plaintiffs:

Q. Where do you live?
A. At Canarsie.
Q. What is your profession?
A. A physician.
Q. How long have you been a physician?
A. Ten years.
Q. How long have you resided in Canarsie?
A. Nine years.
Q. In the practice of your profession?
A. Yes, sir.
Q. What official position, if any, do you hold in the town of Flatbush?
A. I am health officer of the board of health of the town of Flatlands.
Q. Have you, in your capacity as health officer, been called upon to make a report as to certain alleged nuisances at Barren island?
A. I have.
Q. That is within the town of Flatlands?
A. Yes, sir.
Q. When was that report made?
A. I don't remember; about three months ago.
Q. You have visited the island yourself?
A. Yes, sir.
Q. What did you find there; what factories?
A. The factory of E. Frank Coe, the factory of White & Sons and the two fish factories; one of the Barren island guano factory and the other I don't remember the name of.
Q. What is Frank Coe engaged in?
A. Phosphates and ammoniated bone.
Q. What is White & Sons engaged at?
A. Horse rendering; then there was the Barren island fertilizer and oil factory, the fish factory and the Barren Island Guano Company and fish factory.
Q. You made an official report thereon?



A. I did.

Q. Where is that report filed?

A. In the town clerk's office of the town of Flatlands.

Q. Look over and see whether this is a copy of the report you made (handing a paper).

Mr. Cantor objected to the introduction of the report as incompetent, as the witness is present himself to testify.

Mr. Prentice said on his part he was perfectly willing to let it go in.

A. Yes, sir.

The report was offered in evidence. Objected to as not an official report, but merely a communication made by the health officer to the local board of health; secondly, the health officer is here on the witness stand to say what he has to say and we have a right to examine him as to the facts.

Chairman NEWBOLD.—I think that position is sound.

Counsel for the plaintiffs offered the report as an official document on file in relation to these matters, as the expression of the health officer of the town in which Barren island is situated on the date of this report, made officially on the 18th day of August, 1890.

Secretary BALCH.—There is no knowledge before the committee that the health board has taken action on the report of its health officer. The doctor being present can state the substance of his report and what he found on examination. I do not think it is necessary to burden the record with the report.

(The report was excluded and exception taken.)

Q. You made a report?

A. I did.

Q. Do you now recollect what the report was, that I presented to you; with this paper would you be able to refresh your memory?

A. Yes, sir.

Q. Would your memory be as good upon the subject without that report?

(Objected to as incompetent; it is not competent to refresh the witness' recollection unless he swears that he can not remember.)

Q. What did you see on your visit to that island; what was the sanitary condition of E. Coe's factory?

(Objected to the latter question; the first question is a fair one.)

Q. State what you saw; what were the facts?

A. I saw the factory of E. Frank Coe; I saw the different ingredients that were used in mixing the phosphate and the place where the mixing was done.

Q. Were there any disagreeable odors — did you observe any in your passage through the factory?

A. Yes, sir.

Q. What was the character of that smell — there was a smell?

A. Yes, sir.

Q. What was the character of it?

A. It had a smell of phosphates — acid in phosphates — a peculiar gas; it was that odor that I detected.

Q. What was the condition of the factory of White & Sons?

A. It was in very good sanitary condition; fitted with modern appliances.

Q. At the Barren island fertilizer and oil works, what did you see?

A. I saw the boiling of fish and the fish drying on platforms.

Q. Did you observe the fish factory?

A. Yes, sir.

Q. Was there any disagreeable odor there?

A. Yes, sir; it was to me.

Q. What were the recommendations you made to the town board of health?

(Objected to as incompetent; the State Board of Health is not bound by the recommendations made to the local board of health.)

Chairman NEWBOLD.— Let him state what he saw?

Secretary BALCH.— Who sent you to Barren island?

A. I received a communication from the town clerk requesting me to make an investigation of it for the town board of health.

Q. Your conclusions and report were for the guidance of the town board of health?

A. My report and recommendations were made for the benefit of the town board of health.

Q. Have you smelled any disagreeable odors in Canarsie?

A. I have.

Q. Arising from Barren island?

A. Yes, sir.

Q. Did you recognize them as being the same smells you smelled at Barren island?

A. I did.

Q. What is the population of the town of Flatlands?

A. I think about 3,500 or 4,000.

Q. You reside in the town of Canarsie, about how far from Barren island?

A. About four and a half miles.

Q. And you recognize in the town of Canarsie the same smell as you found on Barren island?

A. I do.

Q. Could you distinguish more than one odor;

A. Yes, sir; I could distinguish a fish odor and an odor from the phosphate.

Q. Are those odors more common in summer than in winter?

A. I think not.

Q. Do they prevail throughout the year?

A. We get the fish odor more in summer than in winter; and the odor from Coe's factory in winter more than in summer.

Q There is a prevailing smell all the time—a continuous smell?

A. If the wind is blowing directly from the factory there is a direct odor between a quarter and half a mile away, and if the wind is blowing directly over my house I can detect it.

Q. Will shutting the doors and windows exclude that odor?

A. Yes, sir, I think that it does; I am not so apt to detect it if they are closed.

Q. You find it present in your residence with the doors and windows closed?

A. About four times this summer, probably.

Q. Do you believe the health of the town of Flatlands would be improved if these factories were removed?

(Objected to. That is for the State Board of Health to decide. Counsel claimed that he was a professional witness.)

Secretary BALCH.—I think witness is competent to give his opinion on that question.

A. I do not.

Q. Do you think it would have any effect upon the general health of the town?

A. No, not upon the health of the town.

Q. Well, upon the enjoyment and free use of the air; upon the purity of the air?

A. Yes, sir.

Q. Do you know that it causes a nausea?

A. Not to the healthy.

Q. Did you say in your report to this board that it did cause nausea?

(Objected to.)

A. I did not say in that report that it caused nausea and vomitting in health.

(Mr. Prentice objected to the evidence. He said he was willing to let the report go in but his offer was rejected. Now he can not examine upon it.)

Secretary BALCH.— The report has been excluded but now the witness is giving his opinion on the health of Flatlands as affected by these odors.

Q. Do you regard these odors there as a nuisance from a medical point of view?

(Objected to as already answered.)

Chairman NEWBOLD. — He has given his opinion on that question.

(Counsel wanted his opinion on the affect of the odors upon the enjoyment of property. This was objected to.)

Secretary BALCH.— Witness is competent to act as a medical expert and as a witness upon general facts, but not as an expert on the general effects of these odors.

Q. How does this smell affect you individually?

A. Well, at what distance from the factory?

Q. Well, at Canarsie?

A. I don't know it has ever had any physical effect upon me; it is offensive, disagreeable, and I dislike it.

Q. Has it ever caused nausea to you?

A. No, sir; I don't think it has.

Q. Do you go in bathing?

A. Yes, sir.

Q. Have you smelled the same odors?

A. Yes, sir; while sailing on the bay I smelled the same odors; I never remained where I could get them any length of time; I simply detected the odors and sailed across direct.

Q. Don't they have any physical effect in nauseating you and causing headache?

A. No, sir.

By Mr. KELLY:

Q. Did you visit the fish factories on Barren island?

A. Yes, sir.

Q. Did you notice them boiling fish?

A. I did.

Q. Were the vats covered?

A. No, sir.

Q. You saw the escape of the vapors and fumes which went out into the air?

A. Yes, sir.

Q. Did you see the fish on the platform?

A. Yes, sir.

Q. Did you notice its condition?

A. Some was dry, some wet, and some putrid.

Q. Was there any offensive smell from that putrid fish?

A. There was.

Q. Is that what you call a sickening smell?

A. You mean a smell that would cause nausea?

Q. Yes.

A. In some it would without doubt.

Q. Was it a smell that would be carried for a distance on the breeze?

A. It was.

By Mr. PRENTICE:

Q. I understood you went through the factory of Mr. Coe and Mr. White?

A. Yes, sir.

Q. You found them in good sanitary condition?

A. The factories were in good sanitary condition.

Q. You found the improved processes in use there?

A. Yes sir.

By Mr. FRANKENHEIMER:

Q. The fish odor you say you smelled also in winter.

A. I said no; I smelled the phosphate odor in winter and the fish odor in summer; I did not smell the fish odor in winter that I remember; I think not; they are not boiling or drying fish there during the winter.

Q. Within your recollection — then your recollection as to whether you smelled that odor or not depends upon the fact that they do not run the factories in winter?

A. Not entirely; of course that has some influence.

Q. As to your recollection that you have not smelled any fish smell in winter?

A. On my reason for not smelling any.

Q. You say it was a disagreeable odor?

A. Yes, sir; it is disagreeable to me.

Q. Did it make you sick?

A. It did not.

Q. Do you know to what the odor is due — this fish odor — what constituents of the fish or the processes of boiling or preparing them?

A. I would not like to answer that question without first experimenting.

Q. You are not an expert on the chemical process that takes place when fish are boiled?

A. A chemical expert is supposed to perform some experiment before passing his opinion.

Q. Did you see the fish as they were taken up off the boat?

A. Yes, sir.

Q. The fish were fresh?

A. Yes, sir.

Q. Then they put fresh fish in the vats and boil them?

A. If they have facilities for boiling while they are fresh.

Q. Did you see fresh fish loaded on the cars?

A. I did.

Q. And saw them dumped into the vats?

A. I did.

Q. You didn't see that these fish as they came out of the boats were alive and floundering around on the boats?

A. I don't think I noticed that.

Q. Were they not handling them while you were there?

A. Yes, sir.

Q. Did you see any piled up there that they were not handling?

A. Yes, sir; there were some in a canal boat lying at the dock some time.

Q. How do you know?

A. I was there for some time; I don't live very far from there; I have visited there very frequently.

Q. How long were you there at the time that you made this inspection?

A. Probably three hours.

Q. What fish factory are you speaking of now?

A. I am speaking of the one nearest Mr. Coe's factory; I do not recall the name.

Q. That is Sternfeld's?

A. Yes, sir.

Q. The process then that you saw of boiling fish in a vat was that of boiling fish?

A. Yes, sir.

Q. Did you see them take the fresh scrap and spread it on the platform?

A. Yes, sir.

Q. How long did you stay there?

A. About three hours.

Q. Then it was fresh scrap you saw there spread out on the platform?

A. I saw some fresh scrap.

Q. And you saw unfresh scrap too?

(No answer.)

Q. Don't you know that the odors that arise from boiling fish and spreading out scrap to dry in the sun produce ammonia simply?

A. I do not.

Q. Ammonia is one of the constituent elements of the air; it is in the air?

A. It is.

MRS. CATHARINE CONWAY, sworn for the defendants:

Q. Where do you live?

A. On Barren island.

Q. How long have you lived on Barren island?

A. Twenty-six years.

Q. Before any of these factories were built there?

A. The offal factory was there and White's.

Q. The fish factories were there about twenty years?

A. Yes, sir, and Coe's came about twelve years ago.

Q. You have lived there all this time?
A. Yes, sir; winter and summer.
Q. Are you married?
A. Yes, sir.
Q. Have you a family?
A. Yes, sir.
Q. How many children have you?
A. Seven.
Q. All born on Barren island?
A. With the exception of two born on Rockaway Beach; I have had eight.
Q. Are the seven children still living?
A. Yes, sir.
Q. Have you ever noticed any offensive odors on Barren island?
A. Well, yes, sir, I have.
Q. Have they bothered you to any extent?
A. No, sir.
(Objected to as immaterial.)
Q. You have noticed offensive odors in the country, too?
A. Yes, sir.
Q. You have smelled fertilizers in the fields?
A. Yes, sir.
Q. Was that odor in the field from fertilizers any more bothering to you than the odor on Barren island?
A. No, sir.
Q. Have the odors from Barren island affected your health, or the health of your children?
A. No, sir; I don't know anybody whose health has been affected by the odors there.

Cross-examination:

Q. What is your business?
A. I keep an inn; a hotel.
Q. On Barren island?
A. Yes, sir.
Q. It is a liquor store?
A. Yes, sir.
Q. Whereabouts is your store located?
A. About, I should say, 100 yards from Mr. Coe's factory.
Q. You sell to the people living on the island?

A. Yes, sir.

Q. And to the men working in the factories?

A. Yes, sir.

Q. They are your sole customers?

A. Yes, sir.

Q. You say there are bad smells on Barren island sometimes?

A. Yes, sir; once in a while.

Q. Have you ever smelled bad fish?

A. Yes, sir; once in a while.

Q. When it rains, Mrs. Conway, and then right up comes a hot sun, and this fish is on the platform, there is a smell from it?

A. Yes, sir.

Q. Pretty bad?

A. I don't mind it at all.

Q. Well, to a person not used to it?

A. I don't know what they would think of it; I am judging for myself.

Q. You are used to this smell?

A. I can smell it as well as them that are not used to it.

Q. These platforms are how large — as large as this room?

A. Oh, a hundred times larger.

Q. They are covered with fish?

A. Yes, sir.

Q. Have you been up to the platform after a rainy day?

A. Yes, sir; walked across it.

Q. Sometimes the fish are bad?

A. I don't know what you call bad.

Q. Don't you see worms in them?

A. Yes, sir; I have seen worms in them sometimes; and I have seen them on fresh meat sometimes.

Q. Have you ever been by Mr. Fairchild's — you are near Mr. Fairchild's?

A. Yes, sir.

Q. Have you ever smelled phosphates?

A. Yes, sir.

Q. That has got a smell?

A. Yes, sir; I don't know that it is unhealthful; I think it is a very healthy smell.

Q. How about the other factory down at Mr. White's?

A. It is perfectly right for the business that is carried on there.

Q. Has it a smell?

A. Yes, it has, of course; it must have.

By Mr. CANTOR:

Q. The smell of the fish is a strong fish smell?

A. Yes, sir.

Q. Is there a school on Barren island?

A. Yes, sir.

Q. How many children are there there?

A. About thirty or forty.

Q. How long has the school been established there?

A. For the last twelve or thirteen years.

Q. Your children attend that school?

A. They have attended it.

Q. How far is that school from the factories?

A. About the length of the house from the fish factory; a block I should say.

Q. That is right next to Mr. Coe's factory?

A. Yes, sir, closer than I am to you; it has been carried on regularly; the name of the teacher is Mrs. Catherines.

Q. What is the health of the children that attend that school?

A. First-class.

Mrs. MARGARET SPENCER, sworn for the defendants:

Q. Where do you live?

A. On Barren island and have for twenty years.

Q. Are you married?

A. Yes, sir.

Q. Have you a family?

A. Yes, sir, six children; all born on the island but one and all alive and well.

Q. Have you noticed any offensive odors on Barren island; offensive to you?

A. Not to me; once in a while it will smell, but not much.

Q. Did it ever make you sick?

A. No, sir.

Q. Make any member of your family sick?

A. No, sir.

Q. Any of the children?

A. No, sir.

Q. What has been the health of your family on Barren island?



A. I have lived there twenty years and never had a doctor to me or my family.

Cross-examination:

Q. You are engaged in business on Barren island?

A. Yes, sir.

Q. You keep a saloon?

A. Yes, sir.

Q. Whereabouts is your saloon located?

A. A little west of Mr. Coe's factory.

Q. You sell liquor and ale to the men who work there?

A. Yes, sir; and to the parties who come there.

Q. They are your customers?

A. Yes, sir.

Q. You don't say there is no smell?

A. No, sir.

Q. Have you ever been at the fish factories when they were boiling fish?

A. Yes, sir; I never went into any fish factory.

Q. Was there a smell there when they were boiling?

A. No, sir; there was a smell of fresh fish.

Q. There is a smell?

A. Yes, sir; a little smell.

Q. Have you been on the platform when the fish scrap was spread out on the platform?

A. Yes, sir.

Q. Did you smell anything from that fish spread out on the platform?

A. I could not smell much of anything.

Q. Have you been there on a hot day after it had rained, when the weather was what we called muggy?

A. Yes, sir; then there is a little smell.

Q. Have you noticed any of the fish that were decayed or bad?

A. In wet whether, a little bit.

Q. And sometimes they are rotten?

A. I could't say that.

Q. Did you ever see worms in them?

A. Yes, sir; sometimes.

Q. Do you think it smells bad then?

A. No, sir; I am used to it.

By Mr. FRANKENHEIMER:

Q. How near is your place to the fish factory of Sternfeld's?

A. About half a block away.

Q. You are right near Mr. Coe's factory too?

A. Yes, sir.

By Mr. MCCARTHY:

Q. Do you know Mrs. Whitaker?

A. Yes, sir.

Q. You visit her?

A. Yes, sir.

Q. Have you heard complaints of persons about Barren island from people who visited the place and who have complained of offensive smell?

A. No, sir; I have plenty of people come to visit winter and summer and stay a week at a time, and who never complained of the existence of a smell.

Q. You never heard one of them complain?

A. No, sir; I have not.

Recess till 2 o'clock.

AFTERNOON SESSION.

The committee reassembled at 2 P. M.

Present — All the members, and the hearing was resumed.

Mr. McCarthy asked if a communication had been received from the health officer of Brooklyn. Secretary Balch said that a communication had been received this morning stating that he would meet with the committee, and asking to be informed of the time of the sessions. A telegram had been sent him informing him of the time of the hearing. The secretary also explained the provision of the organic law in regard to inviting members from boards of health to be present during such an investigation. An invitation had been sent to the New York board of health to send a representative, on the ground that the nuisance largely affected New York city, but no invitation had been sent to the Brooklyn board of health.

FENWICK BERGEN, sworn for the plaintiffs:

Q. Where do you reside?

A. In the town of Flatlands.

Q. How long have you resided there?

A. Twenty-six years.

Q. Do you know the location of Barren island?

A. Yes, sir.

Q. In what direction is it from your residence?

A. It is south by southeast.

Q. Are there manufactories between you and Barren island?

A. Nothing whatever.

Q. When the wind comes from the direction you describe do you smell any disagreeable odors?

A. Yes, sir.

Q. How would you describe those odors; what is their effect upon you?

A. When I am at home they are very disagreeable in this way: They give me headaches; I have had malarial fever very much and I lay it to them — to Barren island; when the wind is blowing from Barren island I know it from my headaches; I know I am getting malaria again; I don't know the points of the compass exactly, but it is a trifle east of south; I am about two miles from Canarsie, exactly southwest of Canarsie.

Q. Where do you live?

A. On Bergen island.

(Witness explained to the committee where he lived, on the map.)

Q. What effect have these smells upon you?

A. They give me headaches and malaria when I am at home.

Q. Have you ever smelled them at any time or place besides at your residence?

A. Yes, sir; when on a boat sailing near the east end of Barren island or around Barren island.

Q. You smell them sailing from Canarsie?

A. Yes, sir.

Q. How near did you approach the island in sailing?

A. Within fifty yards.

Q. Did you notice the character of the smell?

A. It affected me differently; I smelled rather a nauseating smell; it made me sick at the stomach; at one time going around the end of the island you would smell rotten dead fish; I could tell it by the smell; then a little while after you would smell dead meat, rotten meat, rotten animals; tell it by the smell; perhaps there is another smell — a kind of an acid smell — phosphate,

a different odor, a different kind; at home I smelled them all combined, seemingly so; it produced this malaria feeling, which I say is caused by the smell from Barren island.

Q. Does the character of these smells differ according to the distance which you are from the island?

A. Yes, sir.

Q. Do you know Mr. Overbaugh?

A. Yes, sir; he resides in my town.

Q. He testified here on a previous occasion?

A. I was not here; he lives in the same town with me; if you look from his house to Barren island you look over ours.

Q. In his testimony he stated that he suffered no inconvenience from those smells; do you think that that is the current opinion in that town?

(Objected to the current opinion.)

Chairman NEWBOLD.— Get his opinion.

Q. Is it your opinion that these odors affect the general health of that town?

A. Yes, sir, it is.

(Counsel asked to have the answer stricken out. Mr. McCarthy cited law to prove that a witness familiar with the effects of a nuisance is competent to express an opinion.)

Secretary BALCH.—The evidence is not competent as that of an expert in any way.

Mr. Cantor asked to have the answer stricken from the record, namely, the answer he gave as to the effect upon the general health of the town.

(Stricken out. Exception.)

Q. Is it regarded as a nuisance?

A. Yes, sir; generally as such.

Cross-examination:

Q. What is your business?

A. I am in the cement business in the city of Brooklyn; I live in Flatlands, pretty much all the year round; I have no residence anywhere else.

Q. You live in Flatlands?

A. Yes, sir; if I have to stay in the city nights I stay in the city; my residence is in Flatlands; I have lived there twenty-six years.

Q. Are you a married man?

A. No, sir.

Q. Who do you live with?

A. My father and brothers and sisters.

Q. Have they lived there the same length of time?

A. No, sir; some of them have lived there longer than I; my father has livèd there sixty odd years.

Q. Is he in business there?

A. No, sir; he is a property-owner.

Q. He owns property in Flatlands?

A. Yes, sir.

Q. Your father had malaria, too?

A. Wretched.

Q. Your family had malaria?

A. Well, no; not the whole family.

Q. All the family had attacks as well as yourself sometime as the result of these smells?

A. Pretty much the whole family.

Q. Well, they continue to live there?

A. Certainly; their interests are there

By Mr. FRANKENHEIMER:

Q. Are the smells continuous?

A. No, sir.

Q. Only in summer?

A. Merely when the wind comes from —

[Question repeated.]

A. No, sir; we smelled them not a week ago.

Q. You smell them in winter?

A. Yes, sir; we smell them in winter.

Q. The same smell as in summer?

A. I said offensive smells in winter.

Q. You can not distinguish the characteristics of this smell when you get it at Flatlands?

A. Only the effects.

Q. You can not distinguish at all where they come from?

A. I know they come from Barren island, but I can not say from which factory, not when I am at home; I am not at home, generally, from 3 o'clock to dark; I can smell those smells in the city of Brooklyn.

Q. You smell them in Brooklyn?

A. Yes, sir; I spend each Sunday in the city of Brooklyn.

Q. You don't spend Sundays at home?

A. The mornings I do; I eat my dinner at home and then I go to the city of Brooklyn.

Q. You get the smell in Flatlands in the mornings and then at dark in the city of Brooklyn?

A. I did not say that; that is your own construction.

Q. Is that what you mean, that you smell it the same day in the morning at Flatlands and in the evening at Brooklyn?

A. No, sir; the wind would have to be different.

Redirect examination:

Q. If the wind were different you might smell it?

A. Yes, sir.

Q. Have you?

A. I could not say that I ever noticed it in Flatlands and Brooklyn on the same day; I have smelled it one day in Flatlands and another day in Brooklyn.

Q. Have the other members of your family been affected in the same way by these odors?

A. Not exactly; but the same way generally.

By Mr. PRENTICE:

Q. How long have you noticed offensive smells?

A. I was only talking for the last six months; I have noticed it ten years.

Q. How old are you?

A. I have lived in Flatlands twenty-six years; I was born there and my father and grandfather before me.

Q. Are you interested in Bergen island?

A. I don't own any part of it.

Q. Your father?

A. Yes, sir.

Q. Have you been interested in the several negotiations for the sale of Bergen island?

A. I have not had a word to say on that subject with any man at any time whatever.

Q. Have you known of those negotiations?

(Objected to as immaterial.)

Mr. Prentice proposed to show the bias of this witness and proposed to follow it up by showing a conversation on his part

with certain persons present here in which he has announced that his sole interest in this inquiry was to effect the sale of Bergen island.

(Objected to; question allowed.)

A. Which negotiations?

Q. The several in progress for the last two or three years for the sale of Bergen island in which prices for Bergen island have advanced several times; have you known of them?

A. I do not know as I can answer yes or no; outsiders always told me before I heard of it from anywhere else.

Q. Have you had a conversation with anyone as to the effect of Barren island on the sale of Bergen island?

A. I do not know.

Q. Are you prepared to say that you did not say in words or substance that your interest in this inquiry was to effect a sale of Bergen island?

A. I do not think I ever mentioned Bergen island or the gentlemen you mentioned before an hour ago.

Q. Did you have a conversation with him as to the sale of Bergen island and the effect of Barren island upon it?

A. I do not think I said anything about Bergen island at all.

Q. Did you have a conversation with Mr. Windheimer to-day or any other occasion in which you referred to complaints against Barren island as in some way affecting the sale of property in which you are interested?

(Objected to as immaterial. Allowed.)

A. I said that I could prove that Barren island was a nuisance to the town of Flatlands, because I know that property there could have been sold to good advantage if it had not been for Barren island.

Q. Was it property in which you were interested?

A. Perhaps I stated so.

Q. If you did say so, was it true?

A. Yes, sir; I would not say it if it was not true.

Q. Is it true, the fact related by the witness at the last session of this committee in New York, that one difficulty in the sale of this property was that the price advanced during this negotiation?

(Objected to.)

By Mr. KELLY:

Q. You say you may have stated that perhaps properties at Bergen island could not be sold by reason of the smells from Barren island; is that so?

A. I said so.

Q. Do you know that the values of properties through that whole region are affected by that?

A. Yes, sir.

Q. Does the smell at Barren island injure that property?

A. Every foot of it that comes under that smell.

EDWIN DAYTON, sworn for the defendants:

Mr. Frankenheimer stated that he had called this witness to show simply that the fish delivered at the factory were fresh. Mr. Kelly has already admitted that, and if that is conceded, there will be no necessity of examining this witness.

Mr. KELLY.—Anything I have admitted on the record I will not dispute. The admission made at the previous hearing by Mr. Kelly was read and Mr. Kelly admitted it again.

CORNELIUS VAN WICKLEN, sworn for the plaintiffs:

Q. Where do you reside?

A. In the twenty-sixth ward, Brooklyn.

Q. What part of that ward?

A. The southern part; along the bay.

Q. How far from the bay?

A. One mile.

Q. How far is your residence from Barren island?

A. Six miles.

Q. In what direction?

A. Southwest.

Q. When the wind comes from a southwest direction, do you smell any disagreeable odors from Barren island?

A. Endurable.

Q. In what way do they affect you; you mean unendurable?

(Objected to.)

A. Unendurable.

Q. How does it affect you?

A. I can not keep any windows open; can not eat a meal of victuals after you smell it once.

Q. How does it affect you personally in your system?

A. You never want to eat after you have smelled it; it nauseates me; makes me sick at the stomach and gives me a headache.

Q. Are you a married man?

A. Yes, sir.

Q. Your wife resides with you?

A. Yes, sir.

Q. How is she affected by it?

(Objected to as not being an expert.)

Q. She is affected by it?

A. Yes, sir.

Q. In what manner is she affected by it?

(Objected to, as witness is testifying how somebody else is affected by the smell.)

Q. You have heard her complain of this smell?

A. Yes, sir.

Q. What apparent affect did this smell have upon her at the time she made the complaint?

A. It made her sick.

Q. In what way?

A. She can not eat anything after it.

Q. You have been in the bay very frequently?

A. Yes, sir.

Q. Have you sailed in the direction of Barren island?

A. Hundreds of times.

Q. Have you sailed in that direction when the wind comes from the southwest?

A. Yes, sir.

Q. And then you smelled this odor?

A. Yes, sir.

Q. How near to the island were you when you smelled this odor?

A. A hundred yards.

Q. Have you been on the island itself?

A. Yes, sir.

Q. Recently — within what period?

A. Last fall.

Q. Were you at the factories — at these three factories?

A. Yes, sir.

Q. At the fish factory?

A. Yes, sir.

Q. State what you saw there?

A. I saw the fish all spread out; all maggotty, spread out in the hot sun.

Q. Did that emit a disagreeable odor?

A. Oh, horrible.

Q. Any other odors?

A. You could not smell anything else.

Q. You did not smell any odor of roses?

A. No, sir; not any roses there.

Q. Have you planted any oysters in Jamaica bay recently?

A. An uncle of mine, a neighbor to me, planted some and they all got killed.

Q. Did you see the oysters?

A. Yes, sir.

Q. What was their condition?

A. Kind of bluish cast.

Q. Any deposit on the shell of the oyster?

A. Yes, sir.

Q. What sort of a deposit?

A. Slimy; color, bluish.

Q. Have you fished in the neighborhood of Barren island?

A. Yes, sir.

Q. How recently have you fished there?

A. Every year for the last twenty years.

Q. Have you seen any sludge floating on the surface of the bay?

A. Yes, sir.

Q. What were the characteristics of it; what was it like?

A. An acid, oily substance.

Q. Do you know whether that has any effect upon the fish or not?

A. It kills the fish.

Q. You have seen dead fish floating about where that substance was?

A. Yes, sir.

(Objected to. How does he know what the effect of it is upon fish?)

Witness: Barren island kills them after the fish have come into the bay.

Secretary BALCH:

Q. How do you know that?

A. I know it.

Q. How do you know it kills after the fish have come into the bay?

A. I have seen fish enough lay dead around there.

Q. It is a matter of common notoriety that dead fish lie around there?

Cross-examination:

Q. What is your business?

A. I am a farmer.

Q. Have you got a farm near where you live?

A. Yes, sir.

By Judge JORALEMON:

Q. You say you fished around Barren island?

A. Yes, sir.

Q. When did you last fish there?

A. In August.

Q. How was your appetite when you were fishing down there?

A. It was not very good when you smelled Barren island.

Q. How was it when you were fishing down there?

(Mr. Kelly objected to this line of evidence. The time of the State Board of Health should not be taken up with the humors of counsel. I think the witness ought to be treated with some consideration. I protest against his being subject to ridicule.)

Judge JORALEMON.— He has testified that these smells destroyed his appetite six miles away and yet he goes right down to fish where the factories are. I want to show the improbability of his statement.

Q. You have testified that at your house, which is six miles from Barren island, that at times you smell a smell which takes away your appetite from you?

A. Yes, sir.

Q. When you sailed around about Barren island to fish, did you have an appetite at that time?

A. No, sir; not when I smelled Barren island.

Q. How long were you gone; all day?

A. Yes, sir.

Q. Did you eat anything while you were down there?

A. Yes, sir; of course I did.

Q. And now you say it affected your eating?

A. Yes, sir.

Q. And gave you a headache and made you sick?

A. Yes, sir.

Q. Did it affect your bowels any, that smell?

A. I don't know as it did.

Q. Did it affect any other portion except your head and stomach?

A. I can't remember.

Q. You have been telling commissioners that the oysters are destroyed down there; do you know what destroys them, of your own knowledge?

A. I expect it is what comes from Barren island?

Q. Do you know, of your own knowledge, what destroys those oysters?

A. That is a question I can not answer very well.

Q. Do you know, of your own knowledge, what destroyed the fish you saw dead around there?

A. Yes, sir; the acids that run from the factories.

Q. Did you say the acids destroyed the fish?

A. It is a pretty hard matter to say.

Q. Did you take any of those fish into your hands to ascertain their condition and to see what killed them?

A. No, sir; I never dissected any fish.

By Mr. PRENTICE:

Q. In what direction did you say your house was?

A. Southwest.

Q. Are you not mistaken in that direction?

A. Not at all.

Q. Did you say it was the southwest wind that brought the odors to you?

A. Yes, sir.

Q. How near are you to Newtown creek?

A. It must be six miles across.

Q. Are you not nearer to Newtown creek than to Barren island?

A. It is about the same thing.

Q. Are you aware that there are great rendering works at Newtown creek?

A. Yes, sir.

Q. Are they of the same character?

A. Barren island is the worst.

Q. How far are the works on Newtown creek from your place?

A. About the same distance I should judge.

Q. When the wind is blowing from what direction do you get those odors from Newtown creek?

A. I can not say that.

Q. Have you ever visited those works at Newtown creek?

A. No, sir.

Redirect examination:

Q. You know the location of the works on Newtown creek?

A. Yes, sir.

Q. What direction from your residence?

A. Somewheres near about northwest.

Q. In order to bring the odors from Newtown creek to your house, the wind would have to come in another direction?

A. Yes, sir.

Cross-examination:

Q. Have you smelled odors from Newtown creek?

A. Yes, sir.

Q. What direction are you from Manhattan Beach?

A. About west.

Q. A short time ago there was a great deal of fault found about the smell from Manhattan Beach?

A. Not that I ever heard of.

Q. Did you never get any smell from Manhattan Beach on account of bad sewerage there?

A. Never.

Q. Were you ever at Manhattan Beach?

A. Yes, sir.

Q. Did you smell those bad odors there when you were at Manhattan Beach?

A. No, sir.

Q. What was the matter with your nose?

(Mr. Kelly protested against the counsel insulting the witness on the stand. The witness has stated that he was at Manhattan

Beach and that he encountered no bad smell; I do not think that because he is a farmer he ought to be insulted on the witness stand.)

Secretary BALCH.— Counsel on both sides must recollect that the investigation is not a farce.

By Mr. FRANKENHEIMER:

Q. You say you were at the fish factories in the fall?

A. Yes, sir; last year.

Q. What month?

A. October; the latter part of it.

Q. You saw all this fish scrap spread out upon the platform?

A. Yes, sir.

Q. All was maggoty?

A. Yes, sir.

Q. Do you know what they do with that fish scrap?

A. They make fertilizer of it.

Q. Do you know that if any of the fish scrap becomes maggoty it is not fit — it is good for nothing as a fertilizer?

(Objected to.)

A. No, sir; I did not know that?

Q. The sun was shining brightly on the day when you were over there?

A. No, sir; it was not shining that day; it was cloudy.

Redirect examination:

Q. It was a warm day when you were there?

A. The latter part of October.

JOHN J. LOTT, sworn for the plaintiffs:

Q. Where do you live?

A. At Canarsie, in the town of Flatlands.

Q. How long have you resided at Canarsie?

A. Where I live now, for thirty-four years.

Q. How far is your residence from Barren island?

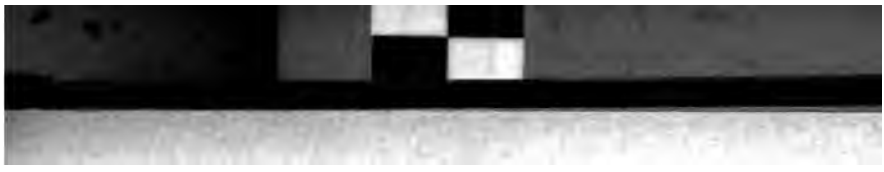
A. As the bird flies, about four miles.

Q. Are there any intervening factories or works between you and Barren island?

A. Not that I know of.

Q. Barren island is in what direction from your residence?

A. South.



Q. When the wind is from the south, do you smell any disagreeable odors?

A. Sometimes I do; I think.

Q. How frequently do you smell those odors?

A. According to how the wind is; if the wind is due southerly, we smell them every day; if the wind is from the west, we don't smell them at all.

Q. Have you smelled them recently?

A. I think last week.

Q. Did you smell them last summer?

A. We did; in September I smelled them, this year, and in May and June.

Q. What months of the year did you smell them most severely?

A. In the spring of the year.

Q. What effect do these odors have upon you?

A. We generally get them about 12 o'clock; we have to close the windows frequently; my wife has been so sick as to go to bed and could not attend to the working of the house; she was sick of the stomach; I have asthma and it affects me quite severely; it closes me up; I can not stand it; I always go to the windward of Barren island, never to the leeward; I have not been in the bay for a year ago last summer; I went down in the steamboat; there were roses about the boat all the way down.

Q. By that you mean the people were nauseated?

A. I don't know what it was, whether it was the odor from the island or not, or seasickness.

Q. You smelled the odor during the passage over?

A. Yes, sir.

Q. How often did you smell these odors during the summer?

A. As often as we have a south wind; it generally strikes between 11 and 12 o'clock and lasts till sundown.

Cross-examination:

By Mr. PRENTICE:

Q. Did you come from your house this morning?

A. Yes, sir.

Q. Did you notice odors, too?

A. I did not.

Q. Did you notice which way the wind was?

A. I did not; I know yesterday it was southeast and the odor did not strike me, but those a little way from me told me they smelled it.

Q. What is your business?

A. I am a farmer.

Q. Do you use fertilizers?

A. Yes, sir, but not Coe's; I would not have it on the place for any consideration; I had it in the barn once and had to take it out; I could not go past it.

By Mr. CANTOR:

Q. You have lived there thirty-four years?

A. Yes, sir.

Q. And your family have lived there?

A. Yes, sir.

Q. And your children?

A. No, sir; I have one child and he is in business for himself; I would not live there one hour if I could get rid of the place; my place is for sale for ten years, but nobody would buy it.

Q. You know there are places in New Jersey for sale and nobody will buy them?

Dr. M. S. CALDWELL, sworn for the defendants:

Examined by Mr. PRENTICE:

Q. What is your position and what public office do you hold?

A. I am a physician.

Q. Are you in the board of health?

A. I am health officer of the village of Far Rockaway.

Q. How long have you been such health officer?

A. The first and only one that has been since over a year.

Q. As such health officer have you received any complaints of any nuisance at Barren island?

A. No, sir.

Q. Has there been any nuisance to your knowledge affecting the health of Rockaway — a nuisance located at Barren island?

A. Not to my knowledge.

Cross-examination:

Q. Do you say, doctor, that you have not heard of any complaints of Barren island?

A. No, sir; only what I read in the papers about this investigation.

Q. Have you heard of any complaints about Barren island?

A. No, sir; not officially, or in any way.

Q. Have you ever heard of Barren island?

A. Yes, sir.

Q. Do you know where it is located?

A. I never was there.

Q. Have you experienced any bad smells from Far Rockaway?

A. Yes, sir.

Q. Do you know what they came from?

A. The fat-rendering establishment of Far Rockaway.

Q. Whereabouts is it?

A. It is suppressed.

Q. How long ago?

A. About two months.

Q. Why did you suppress the fat-rendering establishment?

(Objected to as immaterial, incompetent and irrelevant to the issue; excluded.)

Q. Did this fat-rendering establishment — at this fat-rendering establishment were carcasses of dead animals boiled?

A. No, sir.

Q. What was the nature of that business?

A. It was simply fat-rendering.

Q. Where did they get the fat from?

(Objected to.)

Q. Have you ever been on Barren island?

A. No, sir.

Q. Have you ever smelled any odor from Barren island?

A. Not that I could say was from Barren island.

Q. Have you ever been at a point where you could see Barren island when the wind was blowing from that island towards you?

A. I did not mark down the points of the wind; I have been in view of Barren island a great many times.

Q. Have you experienced smells which you thought were from Barren island?

A. I could not say; I have never been on that ground.

By Mr. KELLY:

Q. The sense of smell exists in crustacea?

A. We have evidence that in the oyster shells there is that same sense of smell.

Q. You are aware that as a scientific fact they have a fiber that conveys to them a sense of smell?

A. I am not an expert on that.

Q. You know it is stated in scientific works?

A. Yes, sir.

Q. If it was shown to you that various acids, sludge acid principally, were thrown upon the surface of a body of water under which oysters were planted, what would you say of those oysters having a sense of smell that might be affected by it?

A. I would not say so.

Q. You have no knowledge on the subject?

A. No, sir.

Q. Your scientific knowledge does not proceed far enough to answer that question?

(Question excluded.)

Dr. JAMES A. HUDSON, sworn for the defendant:

Q. Where do you live?

A. At Pearsall's.

Q. How long have you practiced medicine?

A. Since 1874.

Q. You occupy a public office?

A. Yes, sir.

Q. What is it and where?

A. Health officer of the town of Hempstead.

Q. As such officer have any complaints been made to you of any nuisance originating in Barren island and possibly affecting the health of the people in your town?

A. There have been no complaints made officially.

Q. Have you visited Barren island?

A. Yes, sir.

Q. Have you examined the works there?

A. Casually.

Q. When was the visit made?

A. About the middle of July of this year.

Q. What works did you visit?

A. The horse factory, the fertilizer factory and the fish factories.

Q. What did you find at Mr. White's factory, the horse factory?

A. Well, the morning I arrived there, I found after I was on the dock about five minutes, the boat came with a load of horses, more or less garbage or swill; I stayed by until they unloaded the horses, took them up stairs and disposed of them in kettles.

Q. The tanks were closed when they deposited them?

A. Yes, sir.

Q. What will you say of the condition of the premises and the disposition of this offal and garbage?

A. I thought at the time, that Mr. White had called to his aid all the scientific knowledge on the subject, and that he was doing all that could be done to dispose of the material properly.

Q. What did you find at Mr. Coe's?

A. I found a large quantity of fertilizers, mixed and unmixed.

Q. In what condition were the premises there, and what do you say about method and apparatus?

A. The method was, I suppose, a very good one; not being an expert on that subject, I could not say; everything looked as if they were doing what they could to dispose of the material properly.

Q. You saw the place in which the phosphates were?

A. Yes, sir.

Q. They were stored then within covered buildings?

A. Yes. sir.

Q. What was your opinion, I ask you as a medical man, of the general condition of the island?

(Objected to. The condition of the island is not a question at all. Counsel read an extract from Wood on Nuisances to show that the question was of no account, and that it was purely a question of result. Admitting that this island is in perfect sanitary condition, we are injuriously affected. Question allowed. Exception.)

A. As I saw it, it was in very fair sanitary condition.

Cross-examination:

By Mr. McCARTHY:

Q. You are health officer of the town of Hempstead?

A. Yes, sir.

Q. Has there not been a complaint made by the board of health of the town of Hempstead to the State Board of Health in reference to the existence of certain nuisances on Barren island?

A. Not since I have been health officer.

Q. Do you know of any before that?

A. I do not know anything about it.

Q. You have never heard of the existence of such a complaint?

A. No, sir.

By Mr. KELLY:

Q. Were you on Mr. White's dock when the horse boat came from New York city?

A. Yes, sir.

Q. How many carcasses were there on the boat on that day?

A. I should judge about forty.

Q. What were they?

A. Horses.

Q. All horses?

A. Principally horses; I guess there were some smaller animals, too.

Q. Any dead cows?

A. I didn't see any.

Q. How near to the horse boat did you stand when they were unloading?

A. On her deck.

Q. What was the condition of the animals on the boat?

A. Some of them were approaching the condition of decomposition; others were in very good condition.

Q. Was there any disagreeable odor from the animals on the boat?

A. I did not get any; no.

Q. Did you get any odor at all from them?

A. Yes, sir.

Q. Was it pleasant?

A. Well, the odor that I got was from the use of some disinfectants.

Q. It was the disinfectant that you smelled?

A. Yes, sir.

Q. What was it?

A. I presume it was phenol.

Q. Did you follow these animals through the operations performed in the factory?

A. Well, yes, sir.

Q. Did you see them hoisted up to the cutting-room?

A. Yes, sir.

Q. Were you in the cutting-room when the animals were chopped up?

A. When they were in the process of being chopped up?

Q. The animals are placed on the floor?

A. They are placed on the floor; yes, sir.

Q. Could you tell me about the ceiling in the cutting-up room; has it open lattice work?

A. I don't think it has.

Q. Where does the air come from?

A. It comes in through the windows and doors.

Q. How many windows were there?

A. I didn't count them.

Q. Were there more than one or two?

A. Several; they were open.

Q. Is there a large door on the dock side on this room?

A. Yes, sir; it was open.

Q. What do they do with the animals first when brought into the cutting-room?

A. They lay them down in the room and skin them.

Q. Do they disembowel them after that?

(Mr. Prentice admitted that they skinned the animals and cut them up.)

A. Yes, sir.

Q. What was done with the intestines of the animals?

A. They were put into the vat or apparatus.

Q. How were they taken from the animal to the vat?

A. I don't know that I could tell you, sir; I did not watch it minutely.

Q. After disemboweling were the animals chopped up into pieces?

A. Yes, sir.

Q. You staid in the cutting-up room during the process?

A. I staid in the door-way.

Q. Was there any odor?

A. More or less.

Q. Was it pleasant?

A. No, sir.

Q. How about the floor of this cutting-up room during the operation; was it covered with this matter which was taken from the animals?

A. More or less.

Q. These animals were not placed in any receptacle that you could notice to be cut up in?

A. They were placed in a receptacle immediately afterwards.

Q. While cutting up?

A. I think not.

Q. This matter goes out on the floors from the animals?

A. More or less.

Q. You visited the fertilizer factory of Mr. Coe?

A. Yes, sir.

Q. Did you find there any of this phosphate in piles; quantities of phosphate?

A. Yes, sir.

Q. Ready for shipment?

A. Yes, sir.

Q. What is the odor from that, or was there any odor?

A. Yes, sir.

Q. What is its character?

A. It is rather unpleasant.

Q. Has it an oily smell, doctor?

A. I don't understand your question.

Q. Has it a smell of sludge acid?

A. I think not.

Q. How would you describe the smell?

A. I would not attempt to describe it.

Q. Did you visit the fish factories?

A. Yes, sir.

Q. Did you find them boiling fish?

A. No, sir.

Q. Were they in operation when you were there?

A. I think not; there were scraps of the fish on the platforms? portions of the platforms were covered with fish.

Q. What sort of a day was it, rainy or clear?

A. It had been misty in the morning and was breaking away; it was moderately warm.

Q. What was the condition of the fish you saw on the platform?

A. They seemed to be cut up into fragments and were being dried.

Q. Did you notice whether they were decayed?

A. I think not; I did not see any; there was a smell from them; it was not pleasant; it was offensive.

Q. You encountered a smell at Mr. Coe's factory, at the fish factory, and I ask you would such smell be pleasant entering a private house?

A. Well, I think not.

RICHARD BUCKLEY, sworn for the defendants:

Q. Where do you live?

A. In New York city about half the year; the other half at a point in Jamaica bay, Far Rockaway.

Q. You are an owner of property there?

A. I own considerable in Far Rockaway.

Q. Have you noticed any odors there from the lower bay?

A. I have, sir.

Q. Do you know what it comes from?

A. I investigated, and found what the odors came from; they came from the exposure of the bottom of the bay at low tide.

Q. Were you living at your place this summer?

A. Yes, sir.

Q. Did you notice any offensive odors from Barren island?

A. No, sir.

Q. Did you hear any complaint about it?

A. Yes, sir; I have heard complaints that the odor I called attention to was from Barren island.

Q. Was it so?

A. It was not.

Q. What was it from?

A. It was evidently from the bottom of the bay, because the wind came from thirty degrees north of Barren island.

Cross-examination:

By Mr. KELLY:

Q. What shore do you refer to; the shore of Jamaica bay?

A. I have not mentioned any shore; I saw the bottom of the bay at low tide; when the tide recedes it exposes a great deal of

the bay on either side of the channel; I live at Far Rockaway, at a point jutting out into Jamaica bay.

Q. You know Barren island and Rockaway park.

A. Yes, sir.

Q. You know of any marsh between Barren island and Rockaway park?

A. I don't know whether there is any or not.

Q. You think it is a salt marsh that creates this smell?

A. It certainly is a salt marsh, for I have smelled the exposure of the bottom of the bay when the tide goes out.

EVAN J. MALBONE, sworn for the plaintiffs:

Q. Where do you live?

A. At Canarsie, Long Island.

Q. How long have you resided there?

A. About five years.

Q. How far is your residence from Barren island?

A. About four and a half miles.

Q. Do you know of any intervening factories between you and Barren island?

A. No, sir.

Q. What direction is Barren island from where you reside?

A. A little east of south.

Q. When the wind comes from that direction do you smell any disagreeable, nauseating odors?

A. Quite often.

Q. How often do you smell them?

A. I have been there very little this season; I have smelled them about six or eight times.

Q. What part of the day do you usually smell them?

A. Whenever the wind happens to come from that direction.

Q. When does it usually prevail from that direction?

A. At 11 or 12 o'clock in the day.

Q. During what period of the year?

A. During the summer; it changes from time to time during the day.

Q. You have sailed upon Jamaica bay?

A. Yes, sir; frequently; I did so this summer.

Q. Have you at any time sailed in the direction of Barren island?

A. Yes, sir; several times.

Q. Did you observe any of these nauseating, noisome vapors coming from that direction?

(Objected to the characterization of the odors as nauseating. Question withdrawn.)

Q. What is the character of these odors which you have mentioned?

A. Very disagreeable, indeed; for a person who smells them once will not forget them afterward.

Q. Is there anything that you recall to your sense of smell that they resemble?

A. Nothing that I can compare them with except human excrement.

Q. Does the smell have a disagreeable effect upon you personally?

(Objected to as leading.)

Q. What effect has it upon you personally?

A. It does not have any serious effect except being a disagreeable smell.

Q. Do you cough at times?

A. No, sir.

(Objected to as leading.)

Q. Have you smelled these smells that you describe during the passages that you have previously mentioned towards Barren island?

A. Yes, sir; the same character of smell.

Q. Does it affect your throat?

(Objected to.)

A. Yes, sir; sometimes.

Q. Is it noticeable as you approach Barren island?

A. I think I have smelled it just as severely where I live as when near Barren island.

Q. You own real estate in Canarsie?

A. Yes, sir.

Q. Do you think the value of property in that neighborhood is affected by the existence of the nuisance from Barren island?

(Objected to as irrelevant and incompetent.)

Secretary BALCH.—We can not go into the question of property one way or the other; we can only go into the question of health.

Q. Do you know of any of your people in your neighborhood who are affected in the same way as you have described?

(Objected to. Witness not an expert.)

Secretary BALCH.— He can show if people are sick, but he can not show what is the cause of the disease.

(Exception.)

Q. You pass a part of the summer at Rufflebar?

A. Yes, sir.

Q. In Jamaica bay?

A. Yes, sir.

Q. In what direction is Rufflebar from Barren island; how far?

A. I should say it was a mile and a half in the direction of about south.

Q. When the wind was from the south did you observe these smells and disagreeable odors that you describe?

A. Yes, sir.

Q. Have you at any time seen all of the bay exposed by the winds blowing from the north, driving the water out of the bay?

A. Yes, sir, I have seen very low tides there.

Q. Have you observed any disagreeable smell to arise from this low condition of the tide?

A. No, sir.

Q. Have you been on the salt meadows of the bay during low tide?

A. Yes, sir.

Q. Have you observed any odor such as you describe as coming from the direction of Barren island to arise from those salt marshes?

A. No, sir.

Q. How long have you been familiar with that bay?

A. Fifty years.

Q. You heard the last witness testify as to the odors arising from the bay; did you ever find the smell of the meadow anything like the Barren island smell?

A. Nothing like Barren island whatever.

By Mr. PRENTICE:

Q. This Rufflebar bay is a favorite place for picnics and clam bakes?

A. Yes, sir; and has been this last season.

Redirect examination:

Q. Have you ever heard any of the visitors to Rufflebar during the past summer when you were there express themselves as smelling a bad smell?

(Objected to as hearsay evidence.)

Q. Did you ever know of any complaints being made, in the summer, of a smell at Rufflebar?

(Objected to as hearsay.)

Secretary BALCH.— Witness can state what he knows of his own knowledge?

Q. Have complaints been made in your hearing as to the existence of smells from Barren island?

A. Yes, sir.

Cross-examination:

By Judge JORALEMON:

Q. As to existence of smells?

A. Smells from Barren island; the smell from Barren island is plainly distinct from any other smell.

Q. Is there not a strong fish smell that comes from off the bar at Canarsie?

A. No, sir; I never observed it.

Q. Never observed a fish smell going across that bay?

A. Not a disagreeable smell.

Q. Was there any fish smell at all?

A. Not that I could distinguish.

Q. You have lived at Canarsie fifty years and never smelled a fish smell coming from that bay?

A. I didn't live fifty years there; I have smelled a fish smell frequently.

Redirect examination:

Q. You could distinguish a fish smell from the Barren island smell?

A. Yes, sir.

By Mr. FRANKENHEIMER:

Q. Did you smell these smells the same in the winter as in the summer?

A. Not so frequently in the winter as in summer, but it was the same smell.

ROBERT MCCAFFERTY, sworn for the defendants:

Examined by Mr. PRENTICE:

Q. You are a large property-owner at Far Rockaway?

A. I own some property there.

Q. You are acquainted with the region?

A. Yes, sir.

Q. And have lived there?

A. Yes, sir; in summer, and have done so for the past five years.

Q. Have you been troubled by any offensive odors from Barren island?

A. I have not.

Q. Or your family?

A. Not that I have heard.

Cross-examination:

Q. No bad smells there at all?

A. I have had smells.

Q. Do you know where they came from?

A. No, sir.

Q. Do you know how the wind was when you got them?

A. About west; never in five years but from the west that I can remember.

Q. Have you ever been on Barren island?

A. No, sir.

Q. I suppose you are a friend of Mr. White's?

A. Yes, sir, and of Mr. Kelly.

Q. You have known Mr. White longer than Mr. Kelly?

A. No, sir; not so long.

Q. How long have you known Mr. White?

A. Probably fifteen years.

Q. You came here to-day at his request?

A. Yes, sir.

JOHN J. CAMPBELL, sworn for the defendants:

Examined by Mr. PRENTICE:

Q. You live at Cedarhurst?

A. Yes, sir.

Q. You own some fourteen or fifteen houses at Rockaway?

A. At Rockaway, Cedarhurst and Rockville Centre; they are occupied by tenants.

Q. Do you know of any offensive nuisances or odors, nauseating, from Barren island?

A. No, sir.

Q. Have you had any complaints from your tenants about them?

A. My wife has complained once, and I investigated it; the odor came from my neighbor, who was using a fertilizer.

Q. That was this year?

A. Yes, sir; and the only occasion.

Cross-examination:

Q. How long have you lived at Cedarhurst?

A. About three years.

Q. Do you mean to say you never heard of any bad smells from Barren island?

A. Well, I heard about this investigation.

Q. Before this investigation?

A. As I told you my wife complained and I investigated and found it was from the fertilizer.

Q. Did you ever hear any complaints against Barren island?

A. I can not say.

Q. Before this investigation?

A. I have.

Q. Have you been on Barren island?

A. No, sir.

Q. You don't know of any smells or what the smells from Barren island are?

A. No, sir.

Q. You don't know that these smells that were complained of came from Barren island?

A. No, sir; I think they came from the fertilizer.

Q. What sort of fertilizers were they using?

A. I ain't a judge of fertilizers.

BERNARD KUPFER, sworn for the defendants.

Q. What is your business?

A. Superintendent of the Knickerbocker Brewing Company.

Q. Where do you live?

A. In New York.

Q. During the last two summers where have you spent the summer?

A. At Sheepshead bay, right behind the Oriental Hotel, connected with Manhattan Beach by a bridge, about ten minutes walk from the bridge: I spent one summer, two years ago, entirely there, and the last summer, a part of it.

Q. Did you notice any offensive smells coming from Barren island?

A. No, sir.

Q. Did any of your family notice any?

A. No, sir.

Q. Have any of your family complained of any?

A. No, sir.

Q. Did you hear any of the neighbors in the adjoining cottages complain of any offensive smell from Barren island?

A. No, sir.

Q. Are you in the habit of visiting Manhattan Beach, and very frequently Rockaway Beach?

A. Yes, sir.

Q. Both for pleasure and business?

A. Rockaway and Coney Island on business; I sell beer to the people down there.

Q. Have you frequently in summer visited them?

A. Almost daily Manhattan.

Q. Did you notice any offensive smells at Manhattan Beach coming from Barren island?

A. No, sir.

Cross-examination:

Q. Have you any connection with any of the factories on Barren island?

A. No, sir.

Q. Are you acquainted with any of the gentlemen who operate them?

A. I have very recently become acquainted with one, Mr. Sternfeld.

Q. Do you know Mr. Fleischman?

A. No, sir.

Q. What is your business?

A. I am general manager of the Knickerbocker Brewing Company.

Q. Do you get any bad smells at Sheepshead bay?

A. No, sir.

Q. None at all?

A. No, sir.

Q. On Manhattan Beach?

A. At no time that I remember.

Q. How long have you been at Sheepshead bay?

A. The entire summer two years ago, and part of the past summer.

Q. You have been on Manhattan Beach during the past summer?

A. Yes, sir; almost daily; the same before, and in 1888 almost as frequently.

Q. You never heard of any complaints from any of those places?

A. No, sir.

Q. You don't know that Manhattan Beach has been complaining a number of years about Barren island?

A. No, sir.

JOHN R. PRICE, sworn for the defendants:

Examined by Mr. PRENTICE:

Q. Is your place of business at Newtown creek?

A. In Newtown, Long Island.

Q. Are there large rendering works for offal from Brooklyn?

A. Yes, sir.

Q. Do you know Barren island?

A. Yes, sir; well acquainted with it; I have fished many a time in it.

Q. Have you fished any this last year?

A. Six or seven times.

Q. State any comparison you made as between the odors coming from Newtown creek and those from Barren island.

(Objected to; Newtown creek is not being investigated. Mr. Prentice offered this evidence because witnesses have stated that Barren island smells were found where it is impossible to have smelled them at all; we wish to show what smells there are which may have confused the olfactory senses of the witnesses; excluded.)

Q. Are there rendering works at Newtown creek?

A. Yes, sir.

CHARLES O'HARA, sworn for the defendants:

Q. What is your business?

A. An agent and collector.

Q. Have you been on Barren island?

A. Yes, sir.

Q. Have you visited the school there?

A. Yes, sir.

Q. Have you been in the factories?

A. All of them.

Q. When was that?

A. For the last three years; about twice a week; once or twice a week.

Q. What was the condition of the factories and the island when you saw it this summer?

A. I found the condition of the factories when I visited them — I visited them very frequently — I found them all in clean condition, more especially the horse factory; I have taken my boys to it; they wanted to go and see them cutting up horses; I visited the school when they had their entertainment and participated in it; I was very much pleased; the children were very bright; I was very much pleased with the condition they were in and with the manner in which they conducted themselves.

Q. Were all the visitors down to see the school?

A. Yes, sir.

Q. When was this?

A. The last anniversary; it was in the summer.

Q. In August?

A. No, sir; earlier than that.

Q. In July?

A. It was before July, I think; it was in June.

Q. What time of day were you there?

A. At all hours of the day; I remained over night.

Q. Did you ever see the horse boat unloaded?

A. Many times.

Q. Did you ever have any offensive odors from it?

A. Well, no; not offensive.

Q. How long did it take them to unload it?

A. Very rapidly; I used sometimes want to come up on it, but got left; they went away without me.

Q. Did you smell any offensive odor during the night?

A. No, sir.

Q. You say in June you saw the children there?

A. Yes, sir.

Q. From what you observed of the children as to health, what was their condition?

A. I was surprised to see so many childrenth ere.

Q. What was the general appearance of the children?

A. I thought the name of the island ought to be changed to Prolific island, there were so many young ones there.

Cross-examination:

Q. What is your business?

A. I am agent and collector for an ale and porter house.

Q. Do you sell ale and porter to saloons on the island?

A. To some I do and some I do not.

Q. To Mrs. Conway?

A. Yes, sir.

Q. To Mrs. Spencer?

A. No, sir.

Q. You go down there to collect bills for ale?

A. Yes, sir.

Q. Did I understand you to say that you brought your children to the room where they were cutting up horses?

A. Yes, sir.

Q. Brought them frequently?

A. Yes, sir.

Q. To see them chopping up dead animals?

A. Yes, sir.

Q. Have you been in the fish factory while they were boiling fish?

A. Yes, sir.

Q. Did you notice the vats that the fish were put into?

A. Yes, sir; I walked up around them; I didn't bring my children there; they walked through the factory.

Q. Was there any vapor arising from the vats?

A. I didn't see any.

Q. What were they doing?

A. I didn't see any of that boiling fish.

Q. Any smell?

A. Some; a fish smell.

Q. What did it come from?

A. From the fish.

Q. Was there any vapor to occasion the smell?

A. There was a little smell of fish.

Q. Was it a pleasant smell?

A. For a man who likes fish it was not disagreeable; it was not disagreeable to me, but for a man who loathes fish it might be.

Q. Were you on the platform where the fish scrap was dried?

A. Yes, sir.

Q. Was there any smell about it?

A. Not a disagreeable smell.

Q. Were you there when it was filled with maggots?

A. I never saw it so.

Q. You were not there on those occasions?

A. I have been there on many occasions.

Q. Have you ever smelled bad fish?

A. Yes, sir; at Fulton market, often.

Q. Do you count that a good smell?

A. I didn't find the smell any way disagreeable to me.

Q. Do you think the smell at Barren island is more agreeable than the smell of bad fish?

A. I would rather smell Barren island than Fulton market.

Q. Do you think the fact that you sell the beer has anything to do with the matter?

A. No, sir; I went there to get rid of malaria and I got rid of it.

Q. You say that the object of your visit to Barren island was to get rid of sickness?

A. Yes, sir.

Q. What are you doing now in going there; is it to get rid of sickness?

A. No, sir; to get rid of beer.

Q. And to collect for it?

A. Yes, sir.

Q. How long have you been selling beer?

A. I commenced four years ago.

Q. When did you commence going to the island?

A. About four years ago.

Q. At whose request are you here to-day?

A. Mr. White's.

CHARLES H. SPROENIG, sworn for the defendants:

Q. Were you ever at Barren island?
A. Yes, sir.
Q. When?
A. I was down there different times.
Q. When were you last down there?
A. The last time this year?
Q. Did you go down there last year?
A. Yes, sir.
Q. How did you come to go down to Barren island last year?
A. I was so sick with the fever; the doctor said I was affected a little with consumption, and he sent me to the seashore; I went to Barren island; I stayed there about four weeks.
Q. How did you feel afterwards?
A. Good.
Q. Were you cured of your malaria down there?
A. Yes, sir.

RICHARD HUFFMIRE, sworn for the defendants:

Q. You live at Flatlands?
A. Yes, sir.
Q. Are you troubled at all with offensive smells from Barren island?
A. No, sir.
Q. Are you largely engaged in the oyster business?
A. Yes, sir.
Q. Have you planted any?
A. Yes, sir.
Q. Has there been any ill effect upon the oysters about Barren island?
A. There has not.
Q. Where have you planted oysters?
A. About 2,500 bushels down in the bay, in Flatlands.
Q. Were they injured at all?
A. Not in the least.
Q. Were they in good condition?
A. They were never in better than they are this season.

Cross-examination:

By Mr. KELLY:

Q. Have you ever smelled Barren island?
A. Yes, sir; a little.
Q. How long is it since you have smelled it?
A. About two weeks ago, I should judge.
Q. Do you know what the smell is?
A. Yes, sir.
Q. Where were you when you smelled it?
A. I was home.

By Mr. MCCARTHY:

Q. Are not the oysters in the whole of Jamaica bay unusually good this year?
A. I suppose they are.

Redirect examination:

Q. Was there any tar or acid on the oysters?
A. No, sir.

HARVEY T. KING, sworn for the defendants:

Q. Where do you live?
A. At Canarsie.
Q. You have a hotel at Canarsie?
A. Yes, sir.
Q. Has it been much frequented this year?
A. More so this year than ever.
Q. Have you any complaint to make against Barren island?
A. No, sir; none whatever.
Q. No offensive smell from there?
A. No, sir.
Q. Are you a large oyster dealer?
A. Yes, sir.
Q. How long have you kept a hotel there?
A. This is the thirteenth season.
Q. Any falling off there in business?
A. No, sir, it is on the increase.
Q. How long have you been in the oyster business?
A. Six years.
Q. Have you planted oysters in the neighborhood?

A. Yes, sir, within one mile of the shore.
Q. How near Barren island?
A. About two miles in a direct line.
Q. They were not injured at all in any way?
A. No, sir; they were fatter than ever before.

Cross-examination:

Q. Speaking of the prosperity of your hotel, is its gradual increase traceable to Barren island?
A. No, sir.
Q. Have you ever smelled Barren island?
A. Yes, sir.
Q. How long since?
A. Once during the summer; once or twice, not more than that.
Q. Your hotel is right near where the boat starts for the island?
A. Yes, sir.
Q. Do you know the boatmen and the captain of the tug?
A. Yes, sir.
Q. Do you know Mr. White and Mr. Fairchilds?
A. Yes, sir.
Q. Do they stop in at your hotel?
A. Yes, sir, the same as the public do.
Q. People from Barren island stop considerably at your hotel?
A. Yes, sir.
Q. Would the custom of your hotel be gradually diminished or to any considerable extent if the works were removed from Barren island?
A. It is beyond my power to answer.
Q. You have a good number of customers there from Barren island?
A. Yes, sir.
Q. About what is the population of Barren island, do you know?
A. Statistics will tell you that.
Q. Do you know?
A. No, sir.
Q. About what is the population?
A. I can't answer the question; I don't know.
Q. Is it a thousand in your opinion?
A. I don't know.
Q. Is it about 600?

A. I don't know; I have no idea.

Q. Do you think that your custom would be gradually diminished if the works on Barren island were withdrawn?

A. I could not answer the question; it is on the increase as far as I know now.

Q. The place has grown some in the natural course of development?

A. Yes, sir; very much; it is growing every year.

Q. Do the men working on Barren island stop at your hotel?

A. Yes, sir; at the bar and at the restaurant.

Q. They ride up on the cars?

A. Yes, sir; on the cars and carriages.

Q. Have you any knowledge that the Rockaway Beach and East New York railroad have refused to carry passengers from Barren island on the ground that the clothing that the men wore was offensive to the public?

A. I never knew that they refused to carry them; it would be against the law.

Q. Have you ever heard that the officials objected to carry them?

A. No, sir.

Q. Have you ever smelled these workers when they entered the bar-room?

A. About ten years ago.

Q. You are an oyster planter?

A. Yes, sir.

Q. How far do you plant from Barren island?

A. About one mile and a half.

Q. Have you never made complaint that the sludge acid discharged into Jamaica bay had injuriously affected your oysters?

A. No, sir.

Q. Have you heard others make such complaint?

A. No, sir.

Q. How have your oysters been for the last two or three years?

A. I have always been able to sell them; they have always been good.

By Mr. CANTOR:

Q. How far is your hotel from Barren island?

A. My hotel is three and a half miles from Barren island.

By Judge JORALEMON:

Q. Where else have you had customers from?

A. From Manhattan Beach, New York city and every location where people come from.

Dr. S. A. GOLDSMIDT, sworn for the defendants:

Q. What is your profession?

A. Chemist.

Q. How long have you been in the practice of your profession?

A. I graduated in 1871 from the School of Mines, became inspector of fertilizers for , subsequently was inspector of offensive trades for fifteen years for the New York board of health.

Q. In your experience as inspector of offensive trades have you visited many establishments and seen the rendering processes?

A. Yes, sir; various places.

Q. Have you extended your inquiry by visits to other establishments in other countries?

A. Yes, sir; to several places abroad, in England, France and elsewhere.

Q. Are you now connected with the city board of health?

A. No, sir; I am a manufacturing chemist at No. 21 Jay street, Brooklyn.

Q. Have you lately visited Barren island?

A. Yes, sir.

Q. Have you made an inspection of the works there?

A. Yes, sir.

Q. State what you found; what the processes were in use there, and how far advanced they were in accordance with the best methods in use elsewhere, and what was the condition of the premises from a sanitary point of view?

A. In visiting the works of Mr. Coe, I found they were engaged in the manufacture of superphosphates from South Carolina rock and bone black, by treatment with sulphuric acid of animal matter, ammoniacal matter and some ammoniacal salts; this mixture was conducted in closed receptacles covered with hoods, connected by means of a blower with condensing apparatus, so that any gases remaining uncondensed would pass under the boiler fires; it is the method approved of in all manufacturing estab-

lishments that produce offensive gases as the wisest and most thorough method of disposing of them.

Q. What was the condition of Coe's factory?

A. It was in very good sanitary condition; well managed for that kind of work; the works were large, very large works; I think one of the largest in the country.

Q. Were there any offensive odors therefrom which disseminated to any distance?

A. I think the odor in such manufacturing establishments is of two kinds, one a local odor due to the storage of superphosphates and other material which can not possibly extend to any great distance from the island; the only possible odors which could be complained of as traveling to any distance would be those produced in the mixing, which are taken care of in the condensing apparatus.

Q. Proceed to Mr. White's establishment.

A. In Mr. White's establishment the business is that of rendering dead animals and the swill material produced in the city of New York, a business absolutely necessary to all large cities; the animals are cut up and placed in rendering tanks, the gases from which are taken away through condensing apparatus similar in principle to those in Mr. Coe's factory; the premises were in a cleanly condition.

Q. What do you say about the dissemination of odors from there to any distance?

A. In a similar way as in the case of Coe's; there was a local odor which could be perceived in the immediate vicinity of the building, but it would not travel any distance; the gases produced in the rendering would travel if not condensed, but they were perfectly taken care of.

Q. Have you kept pace with the advancement of scientific knowledge in the rendering of the offal and offensive matter of our great cities?

A. Yes, sir; within the last year I have written quite an article in the Hand Book of Medical Sciences, which has been adopted as an authority in England and many other places, and which has dealt with all matters of that kind.

Q. You have published articles on offensive trades?

A. Yes, sir; in various reports.

Q. At the present state of scientific knowledge for the disposition of refuse matter, how far have the improved methods and

the necessary uses been made of the knowledge and means in these two establishments of Coe's and White's?

(Objected to as irrelevant. The issue has no bearing on the good faith of the people whose works produce these smells. Counsel urged the evidence on the ground that he wished to show that the witnesses Mr. Kelly has called are grossly mistaken, and they they have been confused with other odors. Question allowed.)

A. I think they have adopted the best principles that are known.

Q. What is the result in disposing of the offensive smells?

A. I should think that the apparatus for rendering, if properly used, could dispose of all the offensive smells in the course of the manufacture.

Q. Is it possible for the odors from these establishments to be as offensive as some of the witnesses have testified to?

A. I do not think it is probable.

Cross-examination:

By Mr. KELLY:

Q. You have written a work on offensive trades?

A. Yes, sir.

Q. Is the business of Mr. White on Barren island what is commonly known as an offensive trade?

A. It is classed under that head.

Q. Is Mr. White's and Mr. Fairchild's fertilizer business classed as offensive trades?

A. That is the class under which they would come.

Q. How about the fish establishments?

A. They come under that head, too.

Q. There are a number of gentlemen, not physicians, who have testified on the stand here that they have encountered bad smells at Rockaway Beach when the wind blew from the direction of Barren island, and that they have followed those smells up in boats and traced them directly to Mr. Coe's factory and in some instances to Mr. White's factory; if their testimony is true, would that affect your statement that these smells are never carried to any distance?

A. I think these gentlemen, not being experts, are mistaken in their views.

Q. Has a man to be an expert in order to tell whether a smell is nauseating or not?

A. The smell they might get at Rockaway Beach would not be the same smell that they would have at Mr. White's factory on reaching there; the gases that are produced at the factory are entirely different from any gases close at hand.

Q. Your sole reason is that they are not experts?

A. They would be testifying in such case to an absolute impossibility.

Q. Is it absolutely impossible for the smell from Barren island to reach Rockaway?

A. No, sir; I didn't say that.

Q. These men were not testifying to anything which would be absolutely impossible when they said that that smell reached them at Rockaway?

A. I say that the smell that they perceived at Rockaway Beach would not be the same smell as at Barren island.

Q. When they say that they encountered these same smells at Rockaway Beach?

A. They testified to what they believed doubtless, but still they testified to what would be an impossibility.

Q. Do you say it would be absolutely impossible for the smells from Barren island to reach Rockaway Beach?

A. No, sir.

Q. You think a man must be an expert to tell whether a smell is good or bad?

A. No, sir.

Q. You were on Barren island in Mr. Coe's factory?

A. Yes, sir.

Q. You saw the piles of fertilizer there prepared?

A. Yes, sir.

Q. Was there any odor from it?

A. The peculiar odor described.

Q. Is it pleasant?

A. It is a question of opinion altogether.

Q. To the ordinary nostrils?

A. I think the smell of the superphosphates is such that being in the immediate vicinity with it, it would cease to be noticeable in the course of a very few minutes.

Q. How about the smell of Mr. Coe's phosphates being carried to any distance?

A. I do not think the odor of superphosphates travels to any great distance.

Q. Suppose I take a quart jar of phosphates and take out the cork, would it fill the room with the odor?

A. You would notice it in the room, but not across the street.

Q. You would notice it in the room?

A. Yes, sir, if the room was warm enough to spread it.

Q. About Mr. White's factory; he has put in everything he could to get rid of offensive odors; is that true?

A. I think he has applied all the apparatus properly arranged to destroy offensive odors.

Q. Did you notice the cutting-up room?

A. Yes, sir; it was pretty clean for the business.

Q. How about the ventilation?

A. It was ventilated by windows.

Q. Were they open windows?

A. They were capable of being opened; I presume they were open when I saw them.

Q. Was the door open?

A. I presume so.

Q. Did you notice any open lattice work in the ceiling?

A. Probably it was open; all factories of that kind would have them.

Q. Was there any smell in the cutting-up room?

A. Not any more than would be consistent with the business and would be entirely a local smell; there was a local smell.

Q. Was the local smell a strong smell?

A. No, sir; not specially.

Q. Offensive at all?

A. No, sir; I didn't think it so.

Q. This was the smell from the animals as they were cut up?

A. The animals were in the tanks at the time.

Q. Did you notice the vats in which the garbage was boiled?

A. The rendering tanks; yes, sir.

Q. Not the tanks where the meat was thrown in, but where the garbage was boiled?

A. Yes, sir.

Q. Were they hermetically sealed?

A. I could not answer that.

Q. Was there any vapor escaping from them?

A. No, sir; not at the time.

Q. Were they boiling garbage?

A. I didn't notice that.
Q. When did you visit the island?
A. On the day the State Board of Health visited it.
Q. At whose request?
A. I was requested to go there by Mr. Fairchilds.
Q. With a view to testifying before this committee?
A. I presume so.
Q. Did you visit the fish factories while you were there?
A. Yes, sir.
Q. Were they in operation?
A. Yes, sir.
Q. Boiling fish there?
A. Yes, sir.
Q. Were the vats in which the fish were steamed covered?
A. No, sir.
Q. Was there steam or vapor ascending from those vats?
A. Yes, sir.
Q. Did that vapor have an odor?
A. I was below it.
Q. Was there any fish on the platforms on the day you were there?
A. A little.
Q. Do you know what the condition of the fish was?
A. It was fairly dry.
Q. Do you know whether any of it was decayed?
A. It was, I think, dry scrap.
Q. Was there a smell at the fish factory?
A. The odor belonging to a fish factory; a local smell.
Q. Could that smell from the fish factory be carried to any distance?
A. It is possible.
Q. You have in the course of your profession encountered bad, decayed fish?
A. Yes, sir.
Q. Has that a strong offensive smell?
A. I presume so.
Q. Would it be carried any distance on the wind?
A. It would depend upon the quantity.
Q. Take one of the platforms nearly an acre in extent covered with a layer of fish more or less decayed, and decayed to such an

extent that worms and maggots appeared in it; would that emit an odor that would be carried any distance?

A. It would depend upon the condition of the fish?

Q. Assuming that they were decayed so that the worms came out of them?

A. I presume it would travel a considerable distance.

Q. How far?

A. That I couldn't state.

Q. That is the only smell that you think would travel a distance of two miles?

A. The only kind of smell.

Q. The only kind on the island?

A. I think that would be apt to travel some distance; I would not state how far unless I had experimented to determine.

Q. Assuming there is always a bad smell at Barren island when the wind blows from that direction, encountered as far as three or four miles from Barren island, and it is only encountered when the wind blows from that direction?

A. I could not tell unless I perceived the odor in person.

Q. You never have perceived it?

A. I have perceived none at the Oriental this summer; I was not there in the summer of 1889.

By Mr. McCARTHY:

Q. Doctor, what is the product given off by the factories, the final, ultimate product disposed of in the air from these works, from any of the works and from which?

A. I am afraid that it would be absolutely impossible to give the chemical constituents.

Q. What is the character?

A. There is coal gas, you have probably steam vapor, some sulphurous acid and some sulphuretted hydrogen.

Q. And hydrochloric acid?

A. That depends upon whether they use any in the works; the superphosphate works possibly might have some traces if they were using potash salts for mixing.

Q. Any sulphuretted hydrogen?

A. Some probably, also phosphoretted hydrogen.

Q. What is the proportion of the sulphuretted hydrogen that can be smelled?

A. I do not know, sir.

Q. Do you know that it is stated by authorities that you can smell one part of it in one million parts of air?

A. I presume you could if you were in a close room.

Q. One part of it would disseminate itself through one million parts of air?

A. Yes, sir; but I do not think it would be noticeable to the ordinary person or expert there.

Q. There are certain gases that have no smell?

A. Yes, sir.

Q. Are there any of those given off in those factories that you visited?

A. Yes, sir.

Q. Do you know that there are gases that have no smell and yet are irritating to the bronchial tubes and respiratory system?

A. I am not a physician; I presume they are apt to.

FEELING W. ARVINE, sworn for the defendants:

Q. What is your business?

A. Industrial chemist.

Q. Where do you reside?

A. I live now in New Brighton, Staten Island.

Q. Are you familiar with the fish oil making?

A. Yes, sir.

Q. What experience have you had in connection with fish oil making and the analysis of fish oil; and what is your knowledge of the processes and methods adopted in making fish oil and fish scrap?

A. I have been about most of the fish factories about New York and elsewhere and been employed by some by them.

Q. What companies have employed you?

A. I have been employed by Williams, Clark & Company, the Preston Fertilizer Company and a company of British Columbia; I have drafted a plant for the manufacture of fish oil and fish scrap.

Q. Do you know the fish factories conducted on Barren island?

A. I have not seen them for some ten years; I knew them ten or twelve years ago; I was personally familiar with them then; been in them all.

Q. You saw the method of taking the fish from the vessels, putting them in cars, running them up to the vats and boiling them in the vats?

A. I have seen all.

Q. The taking and pressing of scrap and the taking of scrap and spreading it out on the platform?

A. I have seen it all a great many times.

Q. You stated you are an industrial chemist?

A. I work at analyses; it is my special business.

Q. Is there any offensive odor that is produced by the process of boiling fresh fish in vats, such as you have seen down at Barren island?

(Objected to.)

Q. Assuming, Mr. Arvine, that fresh fish, a large number of fresh fish, are dumped into a large vat, and are boiled by steam in these large vats, what would you say as to gases produced by such processes?

A. When the fish are fresh, as they usually are, I never have noticed any disagreeable odors any more than the boiling of fish in a house or hotel; I never noticed any offensive odors from the boiling of fish in the open vats.

Q. Is that the usual process adopted of boiling fish in large vats?

A. Yes, sir; with open steam.

Q. Is there any gas produced by that process which is of a diffusive character?

A. There are no gases produced from boiling fresh fish; there is a considerable escape of steam and oily matter that accompanies it sufficiently to give it an odor of fish.

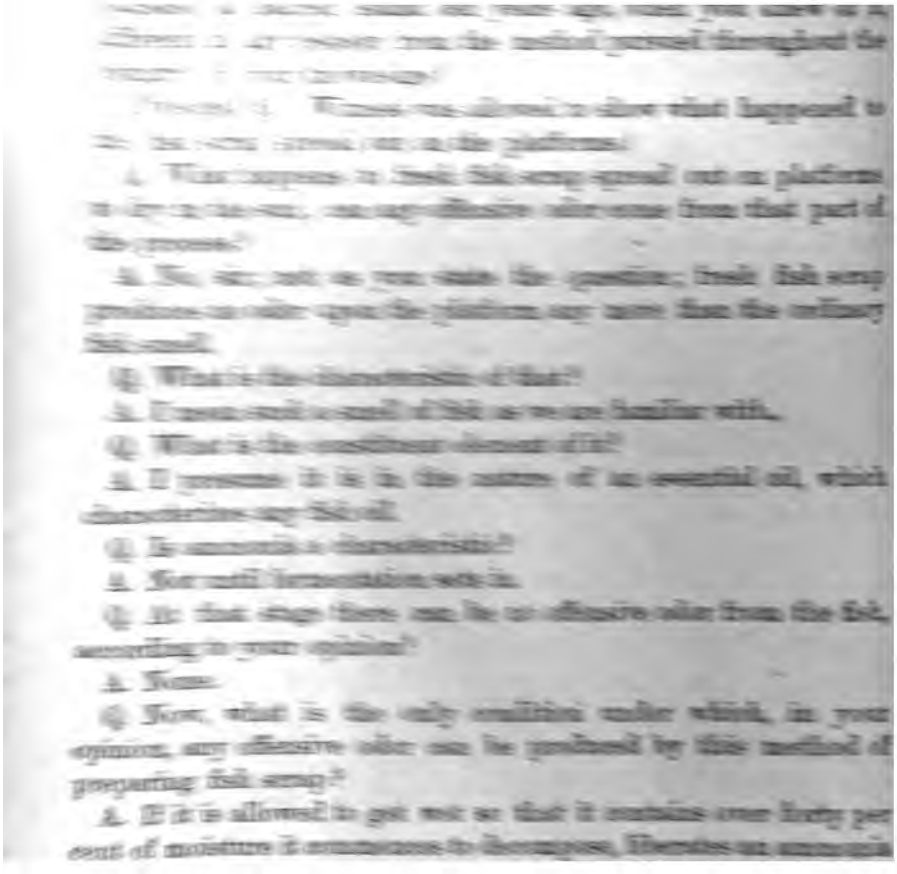
Q. Is the odor produced by that process a diffusive odor?

A. It can not be smelled at any distance from the factory.

Q. Can it be smelled two or three miles from the place where it is boiled?

A. My observation is that it is impossible to smell it any distance.

Q. Take the next step in the process; take this boiled fish and put it under presses and press the oil out of it and then take the residuum and spread it out on the platform, is there any diffusive odor produced by that process?



Q. What would be the effect if the fish scrap became wet and fermented?

A. It would be very much to the detriment of the manufacturer; the maggots would eat up the fish.

Q. Does it become less valuable as a commercial product?

A. Yes, sir; it is sold on its commercial average.

Q. That would affect the commercial value of the fish scrap?

A. Yes, sir.

Q. Then it must be to the interest of every manufacturer of fish scrap to prevent its getting wet?

A. Yes, sir; we always make a great effort to do so.

Q. Now, what other method is there in case fish scrap becomes damp without the manufacturer being able to prevent it; is there any method known to chemistry to prevent any offensive odor from arising from it?

A. I am not aware that it happens that a manufacturer can not prevent it; when the weather is such that they can not dry the scrap in the sun, they dry it with acids to prevent fermentation, and these prevent any offensive odor.

Q. In wet weather the proper method is to treat it with acids?

A. Yes, sir; a small amount of acids.

Q. In dry weather the proper method is to dry it in the open air under the sun?

A. Yes, sir.

Q. And that, in your opinion, can produce no fermentation if the scrap is in the ordinary condition?

A. If the scrap is not wet it produces no disagreeable odors on the drying platform; no diffusive odors.

Q. How frequently have you had occasion to notice fish factories actually in operation on Barren island?

A. I saw them very frequently during probably nine or ten months of every year.

Cross-examination:

By Mr. KELLY:

Q. You saw these factories ten years ago?

A. Yes, sir; I think a little over.

Q. At that time did they boil fish in open vats?

A. Yes, sir; open steam.

Q. At that time did they have large platforms of over an acre on which it was spread out to dry?

A. Yes, sir; about an acre.

Q. Is not there a method by which a vat or tank in which a substance is boiled is capable of being rendered air-tight, so that the vapors can not escape from it?

A. Yes, sir.

Q. If such an arrangement or apparatus had been produced by these fish factories, would that have prevented the escape of steam from the fish when boiling?

A. It certainly would.

Q. Those air-tight apparatuses are well known and have been for some time used?

A. I can not say that they are well known in their application to the boiling of fish.

Q. You mean fish scrap boilers do not generally use them?

A. Yes, sir.

Q. The fish when boiled ten years ago was stirred up by people with poles or sticks?

A. I think not; they were rapidly boiled by the injection of open steam.

Q. Were fish stirred up with sticks or poles in 1889 or 1890?

A. I couldn't say as to that; I never saw them stirred up while boiling.

Q. If this fish scrap spread out becomes wet it is apt to rot?

A. Fermentation sets in; it will rot in a certain length of time; I make a distinction between fermentation and rotting.

Q. Is breathing the smell bad?

A. To some people carbonate of ammonia which escapes in the fish may be offensive.

Q. How about rotting fish; is that offensive?

A. Yes, sir; if it rots it would be offensive to any one.

Q. With worms and maggots in it?

A. It would be in an incipient state of putrefaction.

Q. What is the condition of fish when it putrefies?

A. I think generally—I am not scientific in stating it—but generally when it commences to putrefy, to develop maggots they destroy the putrefying matter; I never saw what is termed rotting fish; I have seen rotten fish in the vessel's hold, but never in the open air exposed to the sun.

Q. If this fish got wet or heated, how then?

A. It would ferment or putrefy in time; I did say I never saw fermented or putrefying fish on Barren island; I have known, I believe, that incipient putrefaction sets in; I didn't say I ever saw fish scrap putrefy on the platform exposed to the sun in the open air.

Q. You say it is apt to putrefy if exposed to the sun and wet?

A. No, sir, I said incipient putrefaction sets in.

Q. If you saw maggots running out of a pile of fish, would you say that was an incipient state of putrefaction?

A. I should say that putrefaction had commenced.

Q. That produces a smell which some people think offensive?

A. Certainly it produces an offensive smell.

Q. Is not that smell carried to any distance?

A. No, sir, I am quite sure of it; I have observed it at times, and I imagine the fish spread on the island is the same now as it was when I observed it.

Q. There are a number of gentlemen who testified here that within a couple of years they have encountered a smell of rotten fish on Rockaway Beach and that they have taken a boat and traced that fish smell up to Barren island; what would you think of that statement, that it was not true?

A. I should think it was impossible to smell any fish on the platforms over on Rockaway Beach.

Q. You have not been there for over ten years?

A. No, sir.

Q. You don't know how they do their business there now?

A. No, sir; only by report.

Q. You would not assume to say that persons who have testified to facts under their own knowledge have testified falsely?

A. By no means, not falsely; I should say I believe it to be impossible.

Q. Is there any way to prevent this fish scrap spread on the platforms from getting wet?

A. Yes, sir; by gathering it right up and putting a tarpaulin over it.

Q. How about roofing it over?

A. That would retard the drying very much; I do not think it would be possible for it ever to enter into a state of putrefaction and fermentation.

Q. When fish is brought there in boats, suppose there is too much fish to go into the vats, what would be the effect of leaving fish there?

(Objected to; it has never happened. Question allowed.)

A. In the course of a couple of days it would be spoiled and would smell bad.

Q. Would that smell be carried to any distance?

A. I have never noticed it carried to any distance.

Q. Ten years ago was there any bad smell that you noticed?

A. I don't think there was any bad smell.

Secretary BALCH.—Fish piled in scrap if treated by acids prevents putrefaction and arrests fermentation?

A. Yes, sir; I have seen fish scrap kept for a number of years when the percentage of moisture was thirty per cent.

Q. If the fish scrap was turned over within twenty-four hours would there be a smell?

A. Very little, if fresh.

Q. Fish scrap piled on the platform and dried in the sun would prevent fermentation?

A. Yes, sir.

Q. Does the inside of the heap commence to ferment sooner than the outside?

A. Yes, sir.

Q. Fish scrap on platforms, if properly protected, does not damage at all?

A. No, sir.

Q. What is the odor?

A. It is principally ammoniacal; it will give it off if it is damaged; if it is piled up in a hurry and gets wet an odor is apt to escape from it.

Q. Would the odor be perceived at any distance?

A. No, sir; the ammonia odor is not carried to any great distance.

Q. What is the effect of treating scraps with acids; does it affect its commercial value?

A. I should think it would, sir; it reduces the percentage of some constituents which are valuable.

Cross-examination:

Q. And lowers its value?

A. Yes, sir.

Q. If the scrap was allowed to become wet and dry again would it become less valuable?

A. Yes, sir; it would become less valuable because it loses some ammonia.

Mr. BOYLE, recalled for the defense:

Examined by Mr. PRENTICE:

Q. You have been sworn in this examination?

A. Yes, sir.

Q. In whose employ were you when you made the inspection of Barren island?

A. The Manhattan Beach Improvement Company.

Q. Was there a fellow inspector with you by the name of Storms?

A. When I first went there, no, sir; not when I first went there.

Q. Were there not two inspectors?

A. Not when I was there first off.

Q. Was Mr. William Storms an inspector with you, taking half the duty?

A. Yes, sir.

Q. Do you know Mr. Ford, of White's establishment?

A. Yes, sir.

Q. Did you make any complaint to him of any nuisance on Barren island?

A. I think so; yes, sir.

Q. Can you tell when it was?

A. I can not tell the day.

Q. Can you tell the month or year?

A. In 1889.

Q. What month?

A. July or August.

Q. Was it remedied?

A. Yes, sir.

Q. Do you know Mr. O'Donnell at Mr. Coe's works?

A. Yes, sir.

Q. In charge of the work?

A. No, sir.

Q. He was a superintendent?

A. No, sir.

Q. Was he the general manager?

A. No, sir; he was bookkeeper.

Q. He was the man to whom complaints would be addressed?

A. I suppose so.

Q. Did you make any complaint to him?

A. I don't believe I did.

Q. Have you within two years known of any sludge tar acid used at these Coe's works or White's?

A. I have not.

Cross-examination:

Q. You were only there in the summer months?

A. That is all.

Q. I understand you went there to protect the interests of Manhattan Beach?

(Objected to. They can not cross-examine their own witness.)

A. I went to Barren island in the interests of the Manhattan Beach Company.

Q. Did you have any employment from the Rockaway Beach.

A. No, sir; nothing whatever to do with it.

JOHN O'DONNELL, sworn for the defendants:

Q. Where do you live?

A. On Barren island.

Q. You are the bookkeeper of Mr. Coe's works?

A. Yes, sir; and have been for several years.

Q. You are the person to whom any complaint would be addressed?

A. Usually so.

Q. You have known these two inspectors, Boyle and Storms?

A. Yes, sir.

Q. Who have been inspecting night and day the establishments there?

A. Yes, sir.

Q. Have any complaints been made to you in reference to any matters by them?

A. No complaints have been tendered to me in any way with the exception that Mr. Storms came when the wind was coming from the eastward in reference to stopping, but we always did it without any telling.

Q. There has been no sludge acid odor there within two years?

A. It would be impossible; we do not receive any.

Q. There are no places of deposit for millions of pounds of sludge acid on the island, as described by one witness?

A. No, sir; we do not receive any.

Cross-examination:

Q. Have you never been asked to shut down when the wind was blowing to Manhattan Beach?

A. Yes, sir.

Q. More than once?

A. Well, we have always shut down.

Q. Question repeated.

A. May be we have been twice.

Q. Have you during the last summer?

A. Not more than once to my knowledge.

Q. That was when the wind was blowing towards Manhattan Beach?

A. Yes, sir.

Q. When the wind was blowing towards Rockaway there was nobody to protect it?

A. The same parties were there.

Q. They never stopped you when the wind was blowing towards Rockaway?

A. We didn't mix any during the time both inspectors were down there.

Q. What was it you were stopped from doing when the wind was blowing towards Manhattan Beach?

A. Grinding.

Q. When the wind was towards Rockaway you didn't stop?

A. They didn't ask.

Q. Are you familiar with the fertilizer factories?

A. Yes, sir.

Q. Any smell from them?

A. Nothing offensive to me, or to anybody, I believe.

By Mr. KELLY:

Q. How long have you been employed by Mr. Coe?

A. Twelve years.

Q. You formerly used sludge acid?

A. Yes, sir.

Q. How was it disposed of in former years?

A. What do you mean?

Q. What did you do with it?

A. Used it in mixing the stuff with.

Q. Any put upon the island?

A. What part do you mean?

Q. The refuse?

A. Oh, the tar we used for filling in purposes.

Q. You distributed it over the island in vacant places?

A. Yes, it was put around the property with coal ashes.

Q. Considerable quantities were distributed on the surface of the island.

A. Yes, sir; but you could build a brick chimney on it ninety feet high.

Q. Does it smell at all?

A. No, sir.

Q. Did it ever smell when it was first thrown out?

A. Coal tar, I suppose, will smell a little.

HENRY H. FORD, sworn for the defendants:

Examined by Mr. PRENTICE:

Q. You are and have been for some time book-keeper at Mr. White's factory on Barren island?

A. Yes, sir.

Q. It was your place to receive any complaints or to report any complaints that were made against the works in reference to nuisances?

A. Yes, sir.

Q. You knew Inspectors Storms and Boyle?

A. Yes, sir.

Q. They were there night and day?

A. Yes, sir.

Q. Do you know whether they reported to Mr. Kelly, the counsel here?

A. They didn't tell me to whom they reported.

Q. Did they ever report to you any nuisance in Mr. White's factory or anything offensive?

A. They never mentioned it.

Q. Have they ever complained?

A. They never mentioned the factory's name.

Q. Don't you use sludge acid there?

A. No, sir.

Q. What did Boyle do when he came to the factory?

A. He used to get out of the boat and come into the office and give me a paper and used to go out of the office, and that is all; he didn't go into the cutting-up room this year; last year he did three or four times.

Cross-examination:

Q. Has there been any improvement in Barren island since the inspectors went down there?

A. In what way?

Q. In your factory?

A. No, sir.

Q. Not in three years?

A. How do you mean?

Q. In the factory?

A. We are always making improvements.

Q. Is it cleaner now than three years ago?

A. Yes, sir.

Q. When did you commence the phenol disinfectant?

A. Long before I got there.

Q. Have you never heard of the inspectors ordering your men to clean up?

A. They never spoke to our men at all; I should have been told of it if they had.

Q. Is there any smell at Barren island?

A. No; I have not smelled any.

Q. From any of the factories?

A. No, sir.

Q. Everything perfectly sweet and wholesome?

A. Yes, sir.

EDWIN STERNFELS, sworn for the defendant:

Examined by Mr. FRANKENHEIMER:

Q. You are secretary and treasurer of the Barren Island Fertilizer Works?

A. Yes, sir.

Q. Known as the Sternfeld factory?

A. Yes, sir.

Q. Owned by your father during his lifetime?

A. Yes, sir.

Q. How long have you been familiar with the business down there on Barren island?

A. About six years.

Q. You are in charge of the factory?

A. Yes, sir; I have charge of it.

Q. What is the first step in making fish scrap?

A. The first step is taking the fish, catching them; taking them from the steamers as they arrive at the factory.

Q. Where are those fish caught?

A. Within a radius of four or five miles of the factory.

Q. They are brought to the factory in steamers?

A. Yes, sir.

Q. Is that an improvement on the old method?

A. Yes, sir; in former days they used sail-boats.

Q. What is the method of accepting fish from the captains of the steamers?

A. Our capacity is for 700,000 a day, but at no time this season since we have been there have we handled that quantity; our capacity never averages more than 400,000.

Q. Do you ever allow any fish to rot on the platforms, there?

A. No, sir; it would be to our detriment to do so.

Q. The fish are taken from the steamers into cars?

A. Yes, sir; received into cars and taken up into the works, and put into vats and boiled; after that they are put under hydraulic presses and the oil extracted; the fish become scrap, and is dried on platforms; it is put under hydraulic pressure to press out the oil and moisture.

Q. The fresh scrap is spread out on platforms?

A. Yes, sir, and dried in the open air.

Q. What do you do in case of wet weather?

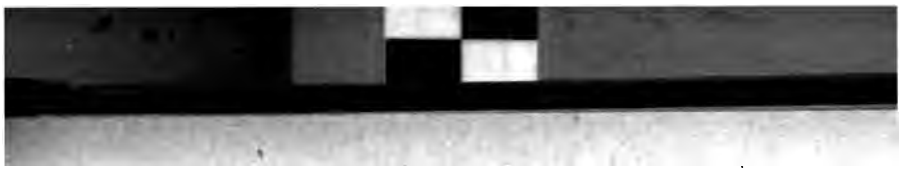
A. The scrap is immediately taken up by a force of men and covered; they generally can detect any storm coming within two or three hours and they make the observation of the weather a particular point.

Q. What effect has wet upon the commercial value of the scrap?

A. It lessens its ammoniated matter and it loses its value; the goods are sold under an analysis of ammonia; so much per hundred; if the goods become wet the value is reduced.

Q. You spread the scrap out on the platforms to dry in the sun?

A. Yes, sir.



Q. And in case of wet weather you gather it up in a heap and cover it with canvas tarpaulins?

A. Yes, sir.

Q. How do you treat the scrap with acid?

A. In wet weather we take green scrap, put it in the shed; to every ton of green scrap there is a certain percentage of acid; that acid is put on to the scrap to prevent fermentation; it is thrown on the heap in the inclosed shed.

Q. Is it a fact that the scrap is left upon your platform to create maggots and to rot?

A. No, sir; that would be entirely to our detriment; it is our interest to get that scrap into merchantable condition within twenty-four hours.

Q. Can you dispose of maggoty scrap?

A. No, sir; we can not; it has to be in a merchantable condition.

Q. What do you call a merchantable condition?

A. So that it would run a certain percentage of ammonia and moisture, not less than ten per cent of ammonia and from ten to twelve per cent of moisture.

Q. I understand you to say it is to the interest of the manufacturer to prevent the scrap from becoming maggoty or rotten?

A. Yes, sir.

Q. Is it also to his interest to prevent the scrap from getting wet?

A. Yes, sir.

Q. How large a force of men have you got?

A. About ninety men now.

Q. How large is your platform for spreading out the scrap?

A. About a thousand feet.

Q. How long would it take your ninety men to gather up this fresh scrap and prevent it from getting wet in wet weather?

A. Probably within an hour.

Q. Do you ever leave that scrap on the platform to rot?

A. No, sir; on no occasion, time or season.

Q. When do you begin operating the factory?

A. We start on the seventeenth of May; this last season it was usually about from the seventeenth of May to the first of June; we stop on the fifteenth of November; most generally for the

last five or six years that has been our custom; we do not run during the winter.

Q. Enumerate the months that you don't run.

A. We commence in May and stop in November; we don't manufacture any during the interval.

Cross-examination:

Q. Are you stationed at Barren island or in the office?

A. I am at Barren island mostly all the time.

Q. Do you boil in open vats?

A. Yes, sir.

Q. Do you remember in 1887 that proceedings were commenced against you by the Manhattan Beach Hotel Company to enjoin your business?

A. I remember it.

Q. Do you remember at that time you agreed to cover the vats?

A. I can not say that; my father, I believe, agreed to do it.

Q. Have you done it?

A. We have not.

Q. That was three years ago?

A. Yes, sir.

Q. Does there steam or vapor arise from the boiling?

A. Yes, sir.

Q. Do you think it is unpleasant?

A. No, sir.

Q. Suppose people do not like the smell of fish in their sleeping-rooms, would it be unpleasant to them?

A. It might be unpleasant to some and not to others; it is not unpleasant to me.

Q. You say it would not be to your interest to have the scrap rot?

A. Yes, sir.

Q. If it did rot would it smell?

A. I don't think it would smell.

Q. Have you ever seen rotten fish?

A. No, sir.

Q. How long have you been on Barren Island?

A. About six years.

Q. You never saw any bad fish?

A. I never saw any decayed fish on

Q. At any other works?

A. No, sir.

Q. Have you not been requested over and over again to cover the vats?

A. I have never been requested.

Q. Has not your company been requested?

A. I believe there was an agreement made to do so.

Q. Have you ever been asked to cover them since?

A. No, sir.

Q. Have the inspectors asked you to cover them?

A. No, sir; never.

Q. When Boyle testifies he asked you to cover them, that is not true?

A. No, sir; it is not true.

Q. Is there any bad smell at Barren island?

A. I can not say that it affects me any.

Q. Is there any unpleasant smell?

A. Not that I know of.

Q. From any of the establishments?

A. I can not tell of the others; I know of my own.

Q. Do you know what particular smell there is?

A. I do.

Q. You say there is no bad smell at Barren island?

A. No, sir.

By Mr. FRANKENHEIMER:

Q. Within what time are the fish brought and delivered to your factory?

A. They are brought in alive; the majority of the fish are caught in the morning and they arrive at the factories at 4 or 5 o'clock.

It is conceded that the fish are fresh when they arrive at the factory.

Both sides were allowed to hand in any papers that they might wish.

Admitted that the testimony that applies to Sternfeld's fish factory will apply to all the other factories.

Testimony closed. Counsel on both sides allowed one week, after the minutes are copied, to submit briefs.

BRIEFS OF COUNSEL.

ARGUMENT FOR THE PETITIONER.

On behalf of the petitioner, the Rockaway Park Improvement Company (Limited), and on behalf of those citizens, residents and property owners on Rockaway park, who have petitioned for the abatement of the nuisances on Barren island, I have no desire to submit any brief on the legal aspect of the case on hearing, or as to the rights and remedies of the parties at law or in equity, touching the matter which has been investigated by you.

This is not a hearing in court; it is not governed by intricate principles of legal forms or practice. The Executive of the State, in conformity with the statute, has referred a complaint to the State Board of Health. That body appointed a subcommittee, which has made a personal visit to Barren island, and on notice to all parties concerned, taken proofs for or against the allegations of the complaint.

The State Board of Health is no stranger to the methods in vogue on Barren island. For nearly ten years it has, on the complaint of numerous citizens, endeavored to correct the evils which have annoyed and injured the territory exposed to the breeze from this island and its factories. The reports of Dr. Hollick, your inspector, on the files in Albany, are a history of the condition of affairs on Barren island for years past. The executive orders issued under the direction of the board, during the administration of Governor Cleveland, are an adjudication on at least one subject of this investigation; *i. e.*, the factory of E. Frank Coe, which was by those proceedings driven from Newtown creek as an offensive and dangerous nuisance. Is it again necessary to take testimony to prove that those proceedings were right and proper?

There is no issue raised by the testimony taken before this committee. The proposition that foul and offensive smells are generated from the operations on Barren island is self-evident. A finding to the contrary would, in the face of the experience of

the community in the neighborhood of Jamaica bay and in the outlying wards of Brooklyn, be little less than ridiculous. It is a matter of public notoriety and has been for years past. The name of the island is a by-word for filthy vapors in the cities of New York and Brooklyn. The petitioning citizens were not invited by the factories to attend on the visit of the committee to the island, and we can not know the impression produced on the gentlemen forming the committee on their personal examination of these factories. But although debarred from taking part in that visit, we confidently assert, although these factories, being apprised of the investigation, appeared in "holiday attire," that your committee must be witnesses to the fact of the noxious smells from this island. And, without referring to the details of the testimony which is before you, we submit that the allegations of the petition are more than borne out by the evidence. We have done all that could be done to trace these smells to their origin. And although the spectacle of a witness "following a smell," in a boat, for a mile, excited the laughter of the proprietors of the factories, it is an important and convincing piece of evidence, and uncontradicted. It is direct proof unanswered. These smells have been so severe at Rockaway park that citizens have been unable to sleep. They have caused sickness at Canarsie; they have interfered with the schools on Rockaway Beach. They have been encountered at Jamaica, at Lawrence and at Auverne. They have driven away residents intending to purchase in the adjoining towns. They cast a blight over a region otherwise the most healthful and attractive on the ocean front of the State. As testified to, if once encountered the odor will always be remembered. Reputable citizens, strangers to the moving party, have voluntarily inconvenienced themselves to come before the committee and tell what they have suffered. The grand jury of the county of Kings has presented the factories as a "public nuisance," and has [illegible] that action be taken looking to their [illegible] in view of this condition of affairs [illegible] this island? There is no tribunal in N[illegible] counties that would say so after [illegible] hearing adduced, by the factories [illegible] the proofs submitted to support [illegible]

The testimony offered by the factories is to some extent similar. So far as the witnesses examined who have never smelled Barren island, I will not take up time by discussing their testimony. It is a familiar principle of law and common sense that in the face of affirmative testimony of credible witnesses to the existence of a fact, negative testimony by persons who merely say they do not know of the fact is worthless and raises no issue.

Following a wise provision of criminal practice, the defendants, with the exception of Sternfeld, the manager of the fish factory, did not take the stand in their own defense, and his experience is an evidence of the wisdom of the rules. They sent, instead, witnesses whose livelihood depends on the existence of these factories. The two women who keep liquor saloons on Barren island, the employés, the merchant who buys the hides, the agent who furnishes the coal, the liquor dealer who sells the beer to the island, none of these witnesses are annoyed at the smell. The coal dealer stood within twenty-five feet of the "horse boat" while unloading; the beer agent takes his children into the "cutting-up room" for healthy, childish recreation; but none of these persons experienced any unpleasant smell. The school trustee said the island was "as clean a place as he had ever visited," and that the pen of 2,000 hogs had no unpleasant perfume, no more so than a pig-pen in your back yard. Now, all this evidence is of a description that I will not attempt to characterize. Neither will I refer to the "club-men," who seek relief from the smells of the taxidermist and find it on Barren island, or the patient who advocates it as a health resort. It would be interesting to analyze the atmospheres from which they came, if their testimony was worthy of discussion.

There is but one remark to be made on this class of testimony, that it was given in a farcical spirit, and with a due respect to the intelligence of the committee, might well have been omitted altogether.

Messrs. White and Coe rest their claim to exemption on the fact that they have large industries on the island, that they have expended large sums of money for apparatus, etc., and, in the case of Mr. White, that the city of New York has no other place for depositing its offal and refuse.

So far as these arguments are concerned they are no answer to the complaint. The improvement of the apparatus at Mr. White's

establishment, the large investment in his business, may, for the sake of argument, be conceded. But why should a business such as this be allowed to exist for these reasons? The large investment brings notoriously large returns. Does the amount involved in the light of continuous complaint for thirteen years justify the offense, or can it be claimed that these petitioners and witnesses shall continue to breathe these foul gases simply that New York city shall be free from them? With equal force can New York deposit its filth at the doors of the Capitol in Albany or in the streets of Syracuse. From a legal point of view the suggestion is absurd in the extreme, but as already suggested I do not cite legal authorities and decisions to the committee. Your honors are not sitting as doctors, or lawyers, or scientists, but of the people and representing the people; the intricate explanations and analyses of the chemical experts do not relieve the nostrils of the citizens.

The unexaggerated narration of the process at Mr. White's factory shows a state of facts inconsistent with absence of offensive smells. Can these numerous quantities of carcasses, offal and garbage be transported to Barren island without offense? While unloading at the dock offensive vapors must be created of necessity. It is no answer to say that it is only for a short time. They should not be endured at all. During the cutting-up process, in a room with open lattice-work roof and open doors and windows, it is impossible to avoid foul odors. And while it may be true that the tanks are sealed and furnished with condensers, they must be opened to receive the carrion, and the tanks for the garbage, it is conceded, have no condensers attached.

Mr. Coe's factory has already been investigated by the State authorities. His fertilizer is treated with acids or other preparations which give it a peculiar oily and disagreeable odor. The witnesses, describing the smells, speak of one variety of odor as "like kerosene oil." Is there any doubt as to its origin? As admitted by Coe's foreman, O'Donnell, and virtually conceded by counsel, the odor from a quart bottle of the fertilizer, which lies exposed by tons, will fill a room as large as the court-room in which your investigation was held, if the stopper be removed. If this is the case, and it can be readily tested, how can it be

disputed that these tons of phosphate or fertilizer emit an overpowering vapor, and in the face of those who have encountered it and have traced it to its source, how can the resulting nuisance be denied?

As to the fish factories on the island the evidence shows them to be an offensive, sickening and inexcusable nuisance.

The "ancient and fish-like smell" has been cited by Shakespeare as an illustration of extreme unpleasantness. The owners of the fish factories speak of it as healthy, pleasant, and "no more offensie than the ordinary smell of boiling fresh fish."

Without referring to the natural objection of some persons to a constant encounter of a smell as refreshing as that of boiling fish in their apartments in order that these factories may extract and dispose of the fish oil, there is another branch of the industry which the factories overlook.

This fish is spread on open platforms for purposes of drying; it is allowed to rot to such an extent that worms are found covering it, and the resulting filthy vapor mixed with the acids used to preserve the compounds, is forced down the throats of the men, women and children within a radius of seven miles from the pest-hole.

This is inexcusable. It is admitted it is a fit subject for the summary action of the Executive and of the State Board of Health. It is a case such as the State Board of Health was created to remedy.

It is conceded that two years ago, under stress of a pending injunction, these fish factories agreed to cover their foul-smelling vats, in which the fish is boiled without cover, and to remedy the horrible nuisance of the rotting of the fish on acres of exposed platforms. They have taken no measures to remedy this condition of affairs. In open and criminal disregard of the rights of their neighbors and the health of the community, they have forced these noxious smells into the houses and sleeping apartments of the petitioners. We ask that justice be meted out to them. In the case of these fish factories there is no excuse attempted, save the flimsy statement that the smells are not "unhealthy." The General Term of the Supreme Court (Second Department) have said that no matter how foul the odor, in cases such as these, some persons will be found who will thrive upon

the smell. But we protest against it; we have complained of it for years, and we now ask from the Executive the absolute suppression of this business. Do not temporize with persons who have flagrantly violated the law, and who for their own profit have inflicted this indescribable vapor upon us.

Counsel for all these defendants have referred to the growth of the territory on Rockaway Beach, Lawrence, Cedarhurst, etc., for what reason I can not well understand.

This locality furnishes a breathing spot to the immense population of the adjoining cities. It is within an hour's ride of New York; it adjoins the city of Brooklyn, Coney island, Rockaway, Canarsie; the localities to which the great mass of the people must resort for fresh air and recreation are within the circle blighted by Barren island.

If the healthfulness of the locality, and the advantage of the ocean breeze has developed this territory, no one has ever suggested the factories on Barren island as an inducement to visitors in search of health.

These establishments threaten the existence of the petitioning corporation; the experience of the residents in Rockaway park have been narrated to the committee, and it is similar to that of the citizens throughout the entire surrounding country.

With the growth of this locality, the demand for the suppression of this concentration of filth becomes louder. What was bearable fifteen years ago, when the adjacent land was untenanted and undeveloped, has become an unendurable nuisance. It is located within a mile and a half of the city limits of Brooklyn; it is under the windows of the inhabitants of Rockaway, Flatlands and Sheepshead bay.

The voice of the entire community and of the press, irrespective of party, calls for its removal, and we ask that this State Board of Health obtain for itself the lasting gratitude of all concerned by the suppression of the redolent nuisance on Barren island.

Respectfully submitted.

WILLIAM J. KELLY,
Attorney for the Petitioners.

BRIEF FOR THE HEIRS-AT-LAW OF JAMES SCHENCK, DECEASED, AND STEPHEN R. SCHENCK, DEVISEE UNDER THE LAST WILL AND TESTAMENT OF STEPHEN SCHENCK, DECEASED, IN FAVOR OF THE ABATEMENT OF THE NUISANCE IN QUESTION.

I.

This examination is made by the State Board of Health under the provisions of section 8 of chapter 322 of the Laws of 1880, as amended by chapter 308 of the Laws of 1882, into nuisance affecting * * * "the health in" the locality of Barren island, Kings county.

II.

Briefly defined, a nuisance is, in general, a wrong arising from the act or omission to act of a person with respect to his own property, whereby the health, property or interest of another person is unlawfully and injuriously affected. (Wood on Nuisances, 2d ed., § 1, § 4; the maxim "*Sic utere tuo alienum non lædas*," is applicable to nuisances. (Wharton's Legal Maxims [Am. ed.], 195, 324.)

Wood on Nuisances, frequently cited in this brief, is the standard and only American text-book upon the subject. It has been cited by the Court of Appeals as an undoubted authority. (See Hegg v. Licht, 80 N. Y., 579, 582, 583.)

III.

The word "health," in this connection, should receive its usual and ordinary interpretation, viz., the full exercise and enjoyment of the senses in the performance of their natural functions as unaffected by any unusual or extraordinary extraneous agencies.

IV.

The complainants in this proceeding claim, on the evidence that under the statute the defendants are guilty of a public nuisance.

A public nuisance is defined by section 385 of the Penal Code, title XII: "Of crimes against the public health and safety." "§ 385. A public nuisance is a crime against the order and economy of the State, and consists of unlawfully doing an act or omitting to perform a duty, which act or omission:

"1. Annoys, injures or endangers the comfort, repose, health or safety of a considerable number of persons, or," etc. (See point XXI.)

"§ 386. An act which affects a considerable number of persons in either of the ways specified in the last section, is not less a nuisance because the extent of the damage is unequal."

"§ 431. A person who deposits, leaves or keeps on or near a highway or route of public travel, either on the land or on the water, any noisome or unwholesome substance, or establishes, maintains, exercises, or carries on, upon or near a public highway or route of public travel, either on the land or on the water, any business, trade or manufacture which is noisome or detrimental to public health, is guilty of a misdemeanor * * * ."

The word "considerable" in the foregoing quotation from the statute should be construed according to its ordinary signification, viz., a number of persons worthy of regard or consideration; a moderate number of persons according to the population of the locality.

Navigable streams and waters are public highways. Jamaica bay is an arm of the sea and therefore navigable. Railroads are public highways. Barren island appears from the evidence to be near both navigable waters and a railroad. (Thompson on Highways [Mills, 3d ed.] 10, 17 et seq, 45 et seq.; Gould v. Waters, § 4, 86; 4 Wait's Actions and Defenses, 758, § 20.)

V.

The existence of a public nuisance does not deprive an individual injuriously affected thereby from his remedy for such damage as is peculiar to himself. Every person injuriously affected by a nuisance has a right to complain. (Wood on Nuisances [2d ed.], § 603, and cases cited, particularly Francis v. Sckoellkopf, 53 N. Y., 152.)

VI.

Health must be injuriously affected in a given locality where persons residing therein are deprived of the free enjoyment of all their senses in a natural manner. Any noxious or noisome vapors, smells or gases which interfere with the full, free and reasonable enjoyment of the sense of smell of any considerable number of persons, affects injuriously the health of that locality.

VII.

It is immaterial that the injury is only occasional and prevails only when the wind is from a certain direction. (Campbell v. Seamen, 63 N. Y., 568.) The infrequency of a nuisance or its temporary character does not make it any the less a nuisance. (Commonwealth v. Gallagher, 1 Allen, 83 Mass., 592; Wood on Nuisance, [2d ed.], § 601; Hutchins v. Smith, 63 Barber, 251, 258.)

VIII.

Although a trade may be perfectly lawful in itself it may become a nuisance by reason of the surrounding circumstances, its proximity to human habitations. And although originally carried on at a place remote from a city or town, the growth of such city or town may render the place an improper one in which to conduct the trade and convert it into a nuisance. The convenience of a place to carry on a noisome or noxious trade or business must be determined by its situation with respect to other property, and it must be at such a place as will not permit it to interfere with the enjoyment of neighboring property. (Wood on Nuisance [2d ed.], §§ 572, 574.)

IX.

The lawfulness, usefulness or necessity of a trade or business is no defense to a charge or nuisance. Nor is the fact that the best appliances and methods known to science have been adopted, or that the highest degree of care and skill have been exercised in carrying it on any defense. (Wood on Nuisances [2d ed.], §§ 514, 552, 553, 555, 559, 512.)

X.

The rights of human habitation are superior to those of trade, and when they conflict the rights of trade must yield to the primary or natural right of habitation. (Aldred's case, 9 Coke, 57, 58; Brady v. Weeks, 3 Barbour, 157; Howard v. Lee, 3 Sanford, 281, 283; Taylor v. People, 6 Parker's Criminal R., 347, 353.) It is the general rule that a public nuisance can not be tolerated on the ground that the community may realize some advantage from its existence. (Weeks v. Junction R. R., 5 McLean 425, 438; see point XXI.)

That the defendants may be pecuniarily injured by the abatement of their works is no defense; nor is the convenience of the location of the works any defense. (Wood on Nuisances [2d ed.], §§ 512, 521, 526.)

XI.

The question is one of effect and not of care, and the point to be determined is, do the works in question result in injuriously affecting the health or comfort of persons residing in the locality of Barren island? (Wood on Nuisances [2d ed.], §§ 559, 546.)

XII.

In a case of nuisance: "The defendant will not be permitted to show that the public benefit resulting from his act is equal to the public inconvenience which arises from it; for this would be to permit a private person to take away a public right, at his discretion, by making a specific compensation." In other words it would be permitting a private person to exercise, on his own volition, the right of eminent domain, which can be exercised only on the permission of the State and for a public use. (3 Greenleaf on Evidences [14th ed.], § 187; see also Wood on Nuisances [2d ed.], §§ 357, 555.)

XIII.

The existence of one nuisance in a neighborhood is no excuse for the existence of another. Each nuisance must be judged as if it stood separate and apart. (Wood on Nuisances [2d ed.], § 547; People v. Mallory, 4 N. Y. Sup. Ct. [Thompson v. Cook], 567.)

XIV.

"This rule is of universal application, that while a man may prosecute such business as he chooses on his own premises, he has no right to erect and maintain a nuisance to the injury of an adjoining proprietor or of his neighbor, even in the pursuit of a lawful trade." (Heeg v. Licht, 80 N. Y., 579, 582.)

XV.

The right to a pure and uncontaminated atmosphere is a natural one and clearly extends to an atmosphere free for all the purposes of breath, health and life. The common law protects a person in the enjoyment of air in its natural, unpolluted state. (Wood on Nuisances [2d. ed.], § 536, 561.)

XVI.

No length of time will legalize or justify a public nuisance. (Dygest v. Schenck, 23 Wend., 446, 448; Mill v. Hall, 9 Wend., 315; People v. Cunningham, 1 Denio, 524, 536; City of Ogdensburg v. Lovejoy, 2 N. Y. Sup. [Thompson v. Cook], 832; affirmed, 58 N. Y., 662, on the opinion of the court below.)

XVII.

Every continuation of a public nuisance is, in judgment of law, a fresh nuisance. (Brown v. Cayuga R. R. Co., 12 N. Y., 486, 492; Vedder v. Vedder, 1 Denio, 257, 261; Beckwith v. Griswold, 29 Barbour, 291, 294; Hause v. Cowing, 1 Lansing, 288.)

XVIII.

To make a noxious trade a nuisance, it is not necessary that it should endanger the health of a neighborhood. It is sufficient if it produces that which is offensive to the senses and impairs the enjoyment of life and property. (Catlin v. Valentine, 9 Paige, 575; Brady v. Weeks, 3 Barbour, 157; Lynche's Case, 6 City Hall Recorder, 61.)

XIX.

It is immaterial whether or or not a particular trade or business has previously been declared a nuisance; if it amounts to an actual invasion of another's rights it is one. (Wood on Nuisances [2d ed.], § 599; Lawson's Rights and Remedies and Practice, § 3001.)

XX.

Any business in which animal matter is used in such a way as to emit noxious vapors or offensive stenches and smells to the annoyance of others is a nuisance. (Wood on Nuisances [2d ed.], § 593.)

The following trades, etc., in which animal matter is used, employed or worked have been held to be nuisances as regarded or referred to by implication as such.

Rendering refuse matter of the city of New York. (*Meigs v. Lister*, 23 *New Jersey Equity Reports*, 199 [8 *C. E. Green*].) *A case very closely resembling the one at bar.* That the city of New York requires some place to dispose of its garbage does not justify the conversion of a particular habitable locality into a pest hole.

Fat melting establishments. (Peck v. Elder, 3 Sandford, 126.) "The answer denies that the melting-house is a nuisance, but it does not, as it could not, deny the fact that the melting of animal fat in such quantities in such a place must be offensive to the senses of the masses of the community, *though persons by long use may become so accustomed to an unwholesome smell as to prevent its making them actually sick.*" (Per Chancellor Walworth, Id., 130, *note;* see Cleveland v. Citizens Gas-Light Co., 20 New Jersey Equity, 201, 205, 206 [5 C. E Green], *post* Point XXI.)

Fertilizer made from the blood of animals. (Manhattan Mfg. & F. Co. v. Van Keuren, 23 N. J. Equity, 251 [8 C. E. Green].)

Tanning and boiling putrid animal matter. (Francis v. Schoellkopf, 23 N. Y., 152, 153.)

A fat or bone boiling establishment. (Cropsey v. Murphy, 1 Hilton, 126; Dubois v. Budlong, 15 Abbott Pr., 445; Ruskman v. Green, 9 Hun, 225; Ferrand v. Marshall, 21 Barbour, 409, 421.)

Slaughter house. (Catlin v. Valentine, 9 Paige, 575; Brady v. Weeks, 3 Barbour, 157); and allowing blood extracts, etc., to remain on premises near public highway. (Taylor v. People, 6 Parker's Criminal R., 347.)

Allowing stomachs and intestines and other offal parts of animals to remain on premises, etc., and boiling and manufacturing viscera and intestines. (Babcock v. N. J. Stock Yards Co., 20 N. J. Equity, 296 [5 E. C. Green].)

Salting hides. (Kennedy v. Phelps, 10 Annual Reports [Louisiana], 227.)

Manufacturing chemicals from dead bodies, guano, etc. (Commonwealth v. Rumford Chemical Works, 16 Gray, 231 [82 Mass.].)

Keeping hogs. (Babcock v. N. J. Stock Yard Co., 20 N. J. Equity, 296 [5 C. E. Green]; Davis v. Smith, 63 Barbour, 251, 258).

Boiling carcasses of dead animals. (Smith v. Cummings, 2 Parsons Selected Equity Cases, 92, 101.)

Using animal blood in the manufacture of coloring matter. (Jameson v. Anthony, 12 F. C. [Sc.], 424 Faculty; Collection of Decisions Scotch Ct. of Sessions, folio ed.)

Burning horse-hoofs. (Gullick v. Tremlett, 20 Weekly R. [N. S.], 358.)

Glue factory. (Charity v. Riddell, 14 F. C. [Sc.], 237; Faculty Collections of Decisions Scotch Ct. of Sessions, fol. ed.)

Manure. (Mixen.) (Flight v. Thomas, 10 Adolphus & Ellis, 590.)

Manufacture of agricultural manure. (Knight v. Gardner, 19 Law Times Reports [N. S.], 673.)

Boiling whale blubber. (Burnt Island Whale Fishing Co. v. Trotter, 5 Wilson & Shaw's Appeal Cases [Sc.], 649, and Dowie v. Oliphant, cited in note, id., 650, 651, 652.)

Fish offal when allowed to putrefy. (Burnt Island Whale Fishing Co. v. Trotter, 5 Wilson & Shaw's Appeal Cases [Sc.], 649; note, p. 650.)

XXI.

"Unpleasant odors, from the very constitution of our nature, render us uncomfortable, and when continued or repeated, make life uncomfortable. To live comfortably is the chief and most reasonable object of man in acquiring property as the means of obtaining it; and any interference with our neighbor in the comfortable enjoyment of life is a wrong which the law will redress. * * * * But whatever is offensive physically to the senses, and by such offensiveness makes life uncomfortable, is a nuisance, *and it is not the less so because there may be persons whose habits and occupations have brought them to endure the same annoyances without discomfort. Other persons or classes of persons whose senses have not been so hardened, and who, by their education and habits of life, retain the sensitiveness of their natural organization, are entitled to enjoy life in comfort as they are constituted.*" (Cleveland v. Citizens' Gas Light Co., 20 New Jersey Equity, 201, 205, 206 [5 C. E. Green], per Chancellor Zabriskie. See point, Antis XX.)

XXII.

The evidence of the witnesses produced by the defendants who smelled no odors, is of a negative character and should not prevail against the positive evidence of the witnesses produced on the part of the complainants. Positive evidence is of greater weight than negative evidence. (1 Wharton's Law of Evidence [3d ed.], § 415.

XXIII.

The committee erred in not admitting the opinion evidence of Fenwick Bergers (page 106), and the like evidence of Evan J. Malbone (128). In cases of nuisance, opinions based upon the personal knowledge of the witness are admissible.

although the witness is not an expert. (Wood on Nuisances, § 610; 2 Greenleaf on Evidence, § 466, *note b* [14th ed.]; Honsee v. Hammond, 39 Barbour, 89, 94.)

XXIV.

The committee erred in not receiving the report of Dr. L. M. Allen, M. D., the health officer of the town of Flatlands. This official is the executive officer of the local board. (Laws 1885, chap. 270, sub-div. 2, § 3.) He holds an official position (id., § 1) and can be required to report; and his report in this instance was a public document made in the discharge of his duty, and under his official sanction and admissible in evidence. While the State Board is not bound by his report, such report, being in relation to the subject-matter of the inquiry, was a part of the *res gestæ* and admissible. The utmost that the defendants could have required was that the health officer should be produced for cross-examination. He was so produced. The best evidence of the contents of his report was the report itself, and it was pertinent to the issue because it involved these very nuisances and was made officially at a recent date and within the time the committee had fixed for its inquiry concerning the effect of the nuisances in his locality. His official report was the best evidence of his opinion. The opinion and recommendations of the witness as contained in his report were admissible as showing what conclusions he had reached in regard to these nuisances at the time when the report was made. The report was not a private document, nor the mere memoranda of a transaction made to refresh the memory, but the formal official report of a statutory public officer, concerning a matter of general and public interest, and sanctioned by his official character and all the presumption of law. (1 Greenleaf on Evidence, §§ 491, 470, 485 [14th ed.]; Stephens' Digest of Evidence [Chase's ed.], art. 73, 74.)

The full Board should now receive such report and take it into consideration in reaching its conclusion.

XXV.

The nuisance in the matter, as appears by the weight of evidence and according to the well established principles of law, is an existent, appreciable and tangent one, and affects and interferes

with the enjoyment of health in the locality in question, and produces in some instances actual physical sickness. That a larger number of witnesses who could testify to actual physical sickness were not produced, was due to the disposition of the committee not to prolong the hearing by the reception of cumulative evidence.

The nuisance in question should be abated and suppressed.

Respectfully submitted.

GEO. D. McCARTY,

Of counsel for the heirs-at-law of James Schenck, deceased, and Stephen R. Schenck, deviser under the last will and testament of Stephen Schenck, deceased, Nos. 67 and 69 William street, New York city.

To the HONORABLE STATE BOARD OF HEALTH, *Albany, N. Y.*

BRIEF OF COUNSEL FOR MESSRS. COE & WHITE.

This inquiry before a committee of the State Board of Health is under section 8 of chapter 322, Laws of 1880, "*into nuisances or questions affecting the security of life and health in any locality,*" and it is a matter of congratulation that the committee has not depended upon any sentimental or speculative reports or opinions, but has taken personal cognizance of the locality and conditions and *res gestæ*. The limitation to questions of security of life and health in the locality have been properly enough extended to a wide outlying region, running out to Brighton Beach and the Narrows on the west, Flatlands, Canarsie and Ozone park on the north, Rockaway and Far Rockaway on the east; but the witnesses who have spoken of the south and southwest have spoken *aliunde*, and outside of the map, unless referring to petroleum odors, which certainly do not come in any way from Barren island.

It were, perhaps, sufficient to rest the official inquiry on the testimony of all the health officers of the several towns mentioned who have been heard (pt. 1, pp. 56, 59, 66; pt. 11, pp. 110, 118, 120), and on the absence of all complaints, except from those who have speculative reasons for assigning every delay or obstruction in their plans to some definite source, and have thus selected a mysterious and to most of them unknown agency by the attractive title of the island. "Barren island's" name has had more

influence with many of the witnesses than any facts they could show the committee. This was evident in the testimony of Mr. Schenck, whose misinformation in respect to sludge acid, the pond, the oysters, etc., etc., was as unreliable as his hearing. Mr. Lord's testimony was significant in that the odors he complained of were like kerosene. Messrs. Arquimbau and Buckley (pt. 11, p. 80; pt. 11, p. 125) were certainly as important witnesses and more judicial in their examination. "The ancient fishy smell" of this whole cost at low tide would elsewhere need but little explanation, to those who frequent the seashore, and Mr. Buckley simply emphasized what could have been found in the same places, and on Bergen island, before a single industry had reached Barren island. Neither on Barren island nor anywhere else was there testimony that "the security of life and health" was in question, as necessary for a finding under the statute.

The most prejudiced witnesses for the complaint confessed two things:

1. That each had noticed the objectionable and suspected odors on very, very few and exceptional occasions, and those very occasions, at evening or early morning, were not when the difficulties complained of would be most efficient.

2. That the neighborhood is losing nothing, but gaining continually, more and more popular for residence, real estate rising, tenants and guests at the hotels not complaining, while the sports of shooting and fishing about the island itself have been uninterrupted.

This evidence alone condemns the complainants. The essential quality of a nuisance is thus lacking, viz., that it "*worketh hurt*, inconvenience or *damage*." (Blackstone 3, 213.) As was said in the common law (Comyn's Dig. 1, 427): "A reasonable use of a right is not a nuisance, though it be to the annoyance of another, as if a butcher or brewer use his trade in a convenient place, though it be to the annoyance of his neighbor."

A more significant example would perhaps be in gas-works. The necessary works and apparatus for the public service and for the benefit of the community, located necessarily in the city or in some cases in the immediate vicinity, are possibly annoying to a few, but for the good of the many.

This suggestion is of the greater importance in this particular inquiry when it is to be admitted, as the honorable committee has

already informally signified, that the security of health and life in the great city of New York is in question, when the most beneficial use of Barren island in the speedy disposition of offal and garbage is in any way obstructed or injuriously affected. *Barren island is necessary to New York city*, and one of the happiest dispensations provided for the material safety and comfort of the city.

The existence of the factories on the island insures the use of the products found; and the other industries are legitimate and for the benefit of the people. Any locality which would exclude the smells of lights and oils, of fish, and fertilizers, of tar and drugs, and chemicals, with that of many natural products, must become a place secluded from commerce and a place deserted by many healthful trades and pursuits which form important parts in the great sum of the industries of our people.

Long Island itself, as almost the whole southern country, is dependent for its agriculture on artificial manures, as was shown on this inquiry. There is a legitimate trade in making, selling, and transporting these artificial manures, and enormous salutary results from their application. Even the fields and lanes, and the cars on the railroad tracks are at times more offensive than any odor wafted by an extraordinary gale from the vicinity of Barren island to Canarsie or Ozone park. At certain seasons of the year, one can not travel, to many portions of the country, away from the odors of fertilizers being brought to and spread upon the fields. He may see and smell them at any station, and observe them again when spread out on the fields. This is not an inquiry into local sentiment at Rockaway and Jamaica, but it is suggested that New York city is the locality where a question of security of life and health is directly involved. It has been well said by the favorite author of the Canarsie delegation, in Woods on Nuisances: "It is not every trifling impregnation of the atmosphere that creates a nuisance. There are many uses of property, for the ordinary purposes of life, that produce more or less discomfort, and where these are necessary incidents of the ordinary use of property, and are only occasional, and produce no real or substantial damage, they must be borne with as results that can not reasonably be avoided. So, too, the damage must be real, not fanciful, not a mere annoyance to a person of fastidious tastes and habits, but such sensible and real damage as a sensible person, if subjected to it, would find injurious to him."

The same author (Woods on Nuisances), has said in section 9 of his text-book, "unless an act or thing is in violation of a right, however much inconvenience, annoyance, discomfort, injury or damage may result therefrom, the act or thing is not a nuisance, and the party injured thereby is remediless," and at section 13, page 20, "Nuisances arise, as has been before stated, from a misuse of property, real or personal, or from a person's own improper conduct; but the *idea* of a nuisance generally is associated with and more commonly *arises from the wrongful use of real property.*"

A further distinction was made by Ch. J. Oakley in the case of Howard v. Lee, which involved the annoyance to the Irving Hotel on Broadway in New York city by a soap factory on Reade street within a hundred feet of the hotel. The court said: "The court can prohibit trades of this character from being carried on in a great city, or in a dense population, on the broad principle that all trades that render the enjoyment of life and property uncomfortable must recede with the advance of population, *and be conducted in the outskirts of the city or in the country.*" The limitation of this doctrine to trades not necessarily carried on in the city itself, or not for any public use or benefit, and again to crowded cities, and reserving a place for necessary trades in the outskirts of the city may be found in many cases as also in common experience. No case can be found where such a distant locality as Barren island, useful in the highest degree to the great city, has been condemned because in disfavor with the outskirts of the city.

I.

No rights of the complainants have been violated.

The security of life and health has not been imperiled, and there has been no misuse of property on Barren island. All the conditions of a nuisance subject to an unfavorable judgment in this proceeding fail.

II.

That a proper, convenient, lawful and highly beneficial use of Barren island is now made and has been made since 1873, *would appear to be a necessary conclusion on the evidence.*

A finding on this point will be of public importance, and have more than temporary influence, because of the status and experience of the State Board of Health.

While other cities, both in foreign lands and in our own State, have to face the problem of the immediate removal and conversion of offal and refuse in their immediate vicinity, so that this all-important police work may be done daily and with the least possible offense, and even on Newtown creek and on the mainland are other works, including those provided for this work from Brooklyn, New York has a great natural advantage in having an island, not too remote (as was feared in 1873), with every appliance, separated by channel of water and where heavenly breezes do all possible for health, and no longer has to suffer from the festering, dangerous methods which occasioned so much anxiety, annoyance and trouble in the locality of New York itself in and prior to 1873.

No evidence on this point has been offered, because it was assumed it was all within the cognizance and experience of the members of the committee and of the State Board. A reference to the annual reports of the New York city board of health in 1873 and 1874, wherein the relief from the old methods is discussed, occasioned by the new use then made of Barren island, will be all that is necessary to establish this reasoning. Not only were the rendering and offal factories at the docks of the city, but the waters about the city were often filled with the carcasses of animals which had to be transported from the city, and were in such quantities that they could not be rendered at all, and besides all the work was not efficient daily. Lawsuits to rid the city of this intolerable nuisance were rendered necessary, and it can not be possible that a return to the savagery of the early days in this business can be thought of. The Legislature itself, impressed with the paramount importance to the city of such disposition as had been made in the matter in 1873, in 1874 passed a law (chapter 636 of Laws of 1874) vesting the exclusive power and authority in the city board of health in "the daily removal of night soil and dead animals, offal, blood, bones and tainted and impure meats and other refuse matter." This refuse can not be thrown into the water, because a nuisance to the adjacent lands, whether in this State or not, and ingenuity has yet to devise a relief more reasonable or safe, not only for the locality itself, but also for the new settlers who have availed themselves of its protection, in building up from the summer overflow of New York city's population, this new

region, where it appears there is only an occasional annoyance and from which certainly there is no unanimity in complaint.

Not even the "far cry" from Rockaway Beach is altogether a complaint, and it may well be a matter of praise that, as it was shown, every means have been taken to prevent annoyance to Manhattan and Brighton Beach, and for two years from these sources there has been no complaint.

In this connection and with a comparison of the reports of their experts, the committee is respectfully asked to read the testimony of Mr. Solomon (pt. 1, pp. 61–66) and Mr. Goldschmidt (pt. 11, pp. 141–148), whose observation is fortified by the largest knowledge and experience.

NOTE.—The refuse of one week from the offal dock in New York was, on October 11, 1890, as follows:

Horses	168
Steers	1
Cows	2
Calves	26
Sheep	22
Dogs and cats from street	280
Dogs from pound	76
	575

Barrels of fish	102
Barrels of street offal	825
Barrels of poultry	28
	955

Imagine this stuff in July or August, when it is greatly increased by condemned meats and vegetables, and further consider the consequences of not disposing of it at Barren island, but dumping it over the bar.

III.

The localities to be first considered in this inquiry are New York city and Barren island.

From them is no conflict of testimony, and all unite in support of the present beneficial use of Barren island.

With the testimony of Dr. Wood (p. 49), Rev. Mr. James (p. 50), Mr. Watts (p. 51), Mr. Beers (p. 52), Mr. Dykes (p. 54), Mr.

Carpenter (p. 55), Judge Hewlett (p. 56), Judge Dumont (p. 59), of the Rockville Centre, Hempstead, board of health, Mr. Van Nostrand (p. 60), Mr. Solomon (p. 61), ex-Health Commissioner and School Commissioner Overbaugh (p. 66), and especially of the visit of the school committee to the island September nineteenth (p. 161), Mrs. Conway (p. 99), Mrs. Margaret Spencer (p. 102), Dr. Caldwell, health officer of Far Rockaway (p. 118), Dr. Hutchinson, health officer of Hempstead (p. 120), Mr. Buckley (p. 125), Mr. McCafferty, of Far Rockaway (p. 130), Mr. Campbell, of Cedarhurst (and having a number of houses and tenants at Rockaway, Cedarhurst and Rockville Centre), Mr. Kupfer (p. 131), Mr. O'Hara (p. 134), Mr. Sproenig (p. 137), Mr. Huffmire, of Flatlands, who also is largely engaged in planting oysters about Barren island (p. 137), Mr. King, of a much frequented hotel at Canarsie, and a large oyster planter, Dr. Goldschmidt (p. 141), Mr. Arvine (p. 148), Mr. O'Donnell (p. 156), Mr. Ford (p. 158), the volume of testimony before the committee is that there is no substantial annoyance, no real and tangible ground for the complaints which have been testified to. Prejudice and fanciful annoyance can not overcome this testimony from the whole region. These witnesses are certainly as disinterested, probably more impartial than the complainants, and when with every opportunity of observation they have not found that Barren island was a cause or source of injury or nuisance, the complainants' case is certainly not made out. The burden of proof was on the complainants and the most they can ask is that the committee will act upon its own judgment and observation.

IV.

The evidence of the complainants answered or disproved, the discussion was sought to be turned upon the so-called "offensive trades."

Some of the complainants seem to imagine the words themselves necessitate extinction. It may, however, not be impertinent even to this learned committee to suggest, that in the discussion of the last few years respecting abattoirs, slaughtering and rendering in the cities, it has been repeatedly shown that the values in the cattle business of New York were greater than that of the output of the gold mines of California or Colorado, and no legislator or well-informed sanitarian has thought it wise to attempt to banish

this trade and slaughtering from the city. What is to become of the refuse? Will these reformers prevent the location of gas-houses where they can be used, all rendering establishments to take fresh refuse and fat, the cattle and sheep yards, the hides in the "swamp" district, the drugs and chemicals of Pearl and Front streets, even the chimney of the United States Assay Office in Wall street?

The consequence must follow as in every such inquiry, that the querulous foreigner or citizen shall learn that in every populous community, the trade, occupation, lives, stores, factories and commerce *of many*, and the public good necessitate some inconvenience *to the few:* but the great activity and prosperity of a city is beyond all comparison with the profits and pleasures of summer visitors or speculators in real estate and newly developed regions.

It is also an easily recognizable fact that some evidence for the defendants could not be reached at the time of the hearing.

V.

Some of the so-called offensive trades must be located in the vicinity of a great city, as we have before seen.

More important does this become when they are a part of the police system or the improvement system of the locality. Thus it is at Barren island. Paris has its sewerage farms at Genevilliers, close by the walls, while Lavillette is within the fortifications. Bedington farm is near Croydon and even in an epidemic Croydon has had no injury thereby. Manchester is another example, but none of these cities are as fortunate as New York. Furthermore, aside from this public interest, New York State would be loth to banish the oil and fish trade from its ports, and the fertilizer business is a legitimate trade and one to be protected.

VI.

The evident confusion of ideas and miscalculation of distances and effects in the witnesses who thought odors from Barren island factories were carried to any distance is more plainly marked when the testimony of Dr. Goldschmidt, Dr. Nutt, Mr. Buckley, Mr. Arquimbau, Mrs. Conway and Mr. Eldert is read.

It appears by Mr. Doyle's evidence on the part of the complaint (pp. 8, 9, 10), that from his daily visits during two years

at the island the most powerful of its smells he could not detect or recognize more than 1,000 feet away or at most within one-half mile. Mrs. Conway (p. 100) says she left this smell of the island one-quarter mile after leaving the island. Dr. Nutt (pp. 29) explains that the fish smell travels further than the other or animal smell, and neither to any great distance. Dr. Goldschmidt (pp. 141, 142, 143, 144, 146, 147) explains more in detail the reasons for this distinction and shows the impossibility of the animal odors being carried to any great distance. Mr. Solomon (p. 61) and Mr. Arvine (pp. 149, 153, 154) show the same facts. While it is undisputed in the evidence and sustained by O'Donnell (p. 156), and Ford (p. 158), that at Manhattan Beach, which would have been most affected had there been any nuisance during the summers of 1889 and 1890, because it lies west and nearer than the residences of most of the complainants, and within any possible effect from the very prevalent east winds of these seasons, for the last two years there have been no complaints from that quarter.

It may be said in addition that the odors complained of could not in reality have been carried to any distance from the island. The witnesses from Canarsie and Ozone park have had something else in their noses and eyes than the real Barren island. It appeared from the evidence on both sides that fishing and shooting about the island were constant sports and nobody found the island intolerable when sport led them within a few hundred feet of its shores. Rufflebar, to the south, was a favorite resort for picnics, and the complainants objected to the question whether the picnickers ever knew of Barren island nuisances (so called).

NOTE.—The hours and direction of the wind for the months of June, July, August and September, 1890, is as follows (at Sandy Hook, New York harbor):

	N.	N. E.	E.	S. E.	S.	S. W.	W.	N. W.	Calm.
June	73½	48½	54½	95½	140½	87	79	100½	41
July	46	14	12	174	179	81	34	144½	59
August	67½	67½	35½	118	133½	89½	59	136½	37
September	99½	106½	14½	96	159½	79½	40½	80	44

VII.

On the part of the respondents it is respectfully suggested that the title on the papers, marked by the stenographer, is erroneous.

This is not an inquiry into "Barren island nuisances," for as we respectfully suggest:

1. The existence of a nuisance can not be presumed in this case.
2. No nuisances have been proved.
3. The questions are limited to the security of life and health.

VIII.

Upon all the facts in the testimony taken and upon the conclusions to be reasonably drawn by the committee from the necessary, lawful and beneficial use of Barren island, we respectfully urge that a report should be made dismissing the complaints, and finding for the great benefits resulting from the exercise of the respondents' rights of property in and their occupation of Barren island.

Respectfully submitted.

W. P. PRENTICE,

Of Counsel for Messrs. Coe and White.

NEW YORK, *December* 8, 1890.

BRIEF FOR THE FISH FACTORIES.

In view of the allegations contained in the petition of the Rockaway Park Improvement Company in reference to the destructive influence of the Barren island factories upon the value of petitioner's property, and in view of the strenuous efforts made by petitioner's counsel to substantiate this allegation by so-called testimony upon this point, it may be well, at the outset, to consider the nature of the powers vested by statute in the State Board of Health and to determine the scope and limits of the present investigation.

We maintain that the State Board of Health was not created to protect property rights against alleged nuisances. For an infringement of such rights an adequate remedy is provided by the common law, which is enforced by the courts, but only in accordance with the established forms of legal procedure. In an action to abate or enjoin an alleged nuisance the defendant can demand that

the complaint be established by legal evidence, and is entitled to a trial by jury. Now the power conferred by statute upon the State Board of Health is of a very extensive and summary nature, and is apparently unhampered by the strict rules of legal procedure. The report of the board, if approved by the Governor, may result in depriving a party of his property without a trial by jury, and without a compliance with the forms of law. Were the board authorized by the statute to exercise their summary power for the protection of property-rights, the statute would clearly be unconstitutional in this respect as tending to deprive a party of his property without due process of law. The only constitutional basis for the powers conferred by the statute upon the Board of Health and the Governor, in reference to the abatement of alleged nuisances, is to construe the same as limited entirely to the protection of life and health.

By examining the statute of 1880 (chapter 322), under which the State Board of Health was organized, and comparing it with the amendment of 1882 (chapter 308), it will be seen that the powers of the board are limited strictly to matters relating to public health. By section 6 it is provided that the board "shall take cognizance of the interests of health and life among the people of the State." The jurisdiction of the board over nuisances is conferred by section 8 of the act. As originally passed in 1880 this section authorized the Governor to require the board to examine into "nuisances or questions affecting the security of life and health in any locality." The qualifying clause was probably intended to apply to nuisances so as to limit the examination to only such nuisances as affected the security of life and health. But to avoid any dispute as to the true interpretation of this section, the Legislature amended this clause in 1882 by striking out the words "or questions," so that the section now reads "*to examine into nuisances affecting the security of life and health in any locality.*" In view of this express declaration of the intent and meaning of the Legislature, it requires no argument to establish the proposition that the State Board of Health has power to examine into only such nuisances as affect the security of life and health in any locality. We claim, therefore, that the complainants in the present investigation were bound to establish by a fair preponderance of evidence that the establishments on Barren island were nuisances affecting the security of life and

health in the adjacent locality, and that all evidence relating to the alleged depreciation of property by reason of the existence of the Barren island factories is entirely irrelevant and incompetent.

While insisting upon the foregoing proposition, still we do not wish to be understood as admitting that Barren island has in any way affected injuriously the value of property in the vicinity. In passing, we merely beg to call the attention of this honorable board to the fact that all the establishments now on Barren island were in existence and in full blast long before and at the very time the development of Manhattan Beach, of Rockaway Beach, of Lawrence, Wave Crest and Auverne was undertaken; that all of these summer resorts were literally created with a full knowledge of the existence of the so-called Barren island nuisances, and that all of them have had their marvelous growth in spite of these so-called nuisances. Is it not preposterous to claim that property has been depreciated by reason of the proximity of the Barren island establishments, when this same property has constantly appreciated, under the very shadow of these establishments, from a nearly nominal value to an almost fabulous value? If Barren island was such a poisonous upas tree as complainant's counsel would have us believe, how can he account for the fact that Coney Island, Rockaway, and all the adjacent popular and and fashionable seaside resorts have sprung into life and have grown and developed into fine proportions under the very Barren island odors which it is now claimed injuriously affect the development of these places?

Be this as it may, we reiterate that this honorable board has power to examine into nuisances only in so far as they affect the security of life and health in any locality, and that complainants are bound to prove by a fair preponderance of evidence that the establishments on Barren island are nuisances affecting the security of life and health in the adjoining locality. This being so, we shall endeavor to establish the following propositions:

First. That the complainants have failed to prove by a preponderance of evidence that the establishments on Barren island affected the security of life and health in the adjoining locality, and that in fact the contrary has been affirmatively established.

Second. That even if the complainants have established that noxious odors emanate from Barren island, affecting injuriously

the adjacent locality, which we deny, still it appears conclusively from the evidence that these odors do not come from the fish factories, because

(*a*). The odors complained of were declared by complainants' witnesses to prevail at a season of the year, viz., winter, during which the fish factories cease operations, and

(*b*). Because the odors emanating from the fish factories are not of a diffusive character.

Third. That so far as the fish factories are concerned the processes carried on at these establishments in the manufacture of fish scrap do not produce any odors injurious to the security of life and health.

I.

The complainants have failed to prove by a fair preponderance of evidence that the establishments on Barren island are nuisances affecting the security of life and health in the adjacent locality; that in fact the contrary has been affirmatively established.

1. The very existence of any offensive odors emanating from Barren island is not only left in doubt, by reason of the conflict of testimony, but is contradicted by the weight of evidence. While the number of witnesses is of slight importance, still we may call attention to the fact that upon this question, defendants have produced twenty-eight witnesses, as against plaintiff's twenty-five. Applying, however, the rule that witnesses are weighed not numbered, it will be seen that defendant's witnesses outweigh those of the plaintiff; first, in disinterestedness; second, in standing; and third, in special qualifications to testify upon the subject. As to the interest or motive of the witnesses it must be remembered that of the plaintiff's witnesses, the following had an interest, more or less active, to exaggerate the alleged evils complained of, viz.: Boyle, the paid inspector of the Manhattan Beach Company, the co-plaintiff in this proceeding; Shelley, manager of the Oriental hotel; Williams, superintendent of Rockaway Park Improvement Company; Burroughs, treasurer of Auverne Improvement Company; Bergen, interested in Bergen island, and the following owners of real estate at Rockaway, Lawrence and Canarsie, who believe that the vicinity of Barren island with its present reputation, whether justified by the fact or not, injuriously affects the value of their property, viz.: Simmons,

Schwenke, Lefferts, Holland, Wollenweber, Jones, Schenck, Lord, Lott, Malbone. It is natural that the sense of pecuniary interest should sharpen the olfactory sense of these witnesses and make them smell Barren island in every disagreeable odor borne upon the winds of Heaven. On the other hand look at defendants' witnesses. They are either doctors (Wood, Caldwell, Hudson), ministers (James), judges and public officials (Hewlett, Dumont, Carpenter), teachers (Overbaugh), chemists (Goldsmith, Arvine), business men (Watts, insurance; Beers, grocer; Dykes, real estate; Van Nostrand, coal; Solomon, tanner; Kupfer, superintendent; O'Hara, collector; Huffmire, oysters; Sargard, taxidermist), all of whom are without any interest but that of fair dealing in this matter, or they are large property-owners in the vicinity of Barren island, whose interest, as such property-owners, is hostile to Barren island, viz.: Arquimbau, Wave Crest; Buckley, Far Rockaway; McCafferty, Far Rockaway; Campbell, Rockaway, Cedarhurst and Rockville Centre; King, Canarsie. As to the standing of defendants' witnesses as compared with that of plaintiffs' witnesses we can safely claim, without making any invidious comparisons, that the witnesses for the defense outweigh those of the plaintiff in this respect. As to the special qualifications of the witnesses, we need only refer to the fact that the only specialists called by the plaintiff were young Dr. Nutt, of Jamaica, a friend of Mr. Williams, superintendent of the complainant company, and Dr. Allen, whom we shall claim as our witness. Defendants produced Dr. Wood, of Jamaica; Judges Hewlett and Dumont, of the board of health of Hempstead; Overbaugh, ex-member of board of health of Flatlands; Dr. Caldwell, health officer of Far Rockaway; Dr. Hudson, health officer of Hempstead, and the chemists, Goldschmidt and Arvine. Most of these specialists called by the defendants had visited Barren island and were familiar with its conditions and the manufacturing processes carried on there. We claim, therefore, that the weight of the evidence is against the alleged prevalence in the adjacent locality of disagreeable odors emanating from Barren island.

2. But even if this were not so, there is no proof, whatsoever, that the odors complained of affect the security of life and health in any way; on the contrary the very opposite is estab-

lished by some of the plaintiff's witnesses and by all the witnesses for the defense. Dr. Nutt testifies that the odor is offensive, but does not say that it affects health in any way; Simmons, who first testified that the odor created nausea and headache, subsequently says, "I do not think smell imperils health," (p. 18). Malbone says smell, while disagreeable, has no serious effect (87). Almost all the other witnesses for the complainant merely testified that the odor was disagreeable and offensive, except Schenck, Bergen and Lott, who testified to physical effects produced by the odors, but the evident bias of these witnesses against the defendants throws discredit on their testimony. But most important of all, Dr. Allen, the health officer of Flatlands, within whose jurisdiction Barren island is situated, and who was called by the complainants, testified as follows (p. 34):

"Q. *Do you believe the health of the town of Flatlands would be improved if these factories were removed?*

"A. *I do not.*

"Q. *Do you think it would have any effect upon the general health of the town?*

"A. *No; not upon the health of the town.*"

He further testified that while he considered the smell offensive and disagreeable, *it had no physical effect upon him.* As to the witnesses for the defense, all of them testify that the odors upon the island are in no way injurious to health. See especially testimony of Dr. Hudson, Judges Hewlett and Dumond, members of the board of health of Hempstead; Mr. Overbaugh, ex-member of the board of health of Flatlands, and the chemists Goldschmidt and Arvine, all of whom visited Barren island.

3. As proof of the inoffensive character of the manufacturing processes carried on at Barren island, we refer especially to the testimony of Mrs. Conway and Mrs. Spencer, who have each lived on the island for more than twenty years, have each raised families of six or seven children on the island, without losing one or even requiring medical advice for any member of their family. We refer also to the testimony of Mr. Overbaugh, teacher, and ex-member of the board of health, and of Mr. O'Hara, as to the salubrious condition of the island. And finally we point to the fact that, within a stone's throw of the fish factories, there exists upon this very island a public school with an attendance of

forty children, whose health, in the words of Mrs. Conway, is "first-class." It seems to us that this fact in itself is a most conclusive refutation of the charges alleged in the petition herein, that the Barren island factories seriously endanger the health of the entire population of Rockaway Beach and the adjoining villages. Having failed to establish this charge, the whole basis for complainants' proceedings herein is taken away.

II.

Even if the complainants have established that noxious odors emanate from Barren island, which we deny, still it appears conclusively from the evidence that these odors do not come from the fish factories, because, *firstly*, the odors complained of were declared by complainant's witnesses to prevail at a season of the year — winter — during which the fish factories cease operations; and *secondly*, because the odors emanating from the fish factories are not of a diffusive character.

1. Plaintiff's witnesses testified that the offensive odors complained of prevailed as well during winter as during the summer. (Schwenke, pp. 35, 37; Burroughs, p. 38; Lefferts, p. 40; Holland, pp. 41, 42; Williams, p. 44; Wollenweber, p. 45; Baker, p. 48; Jones, p. 49; Candee, p. 75; Lord, p. 85; Bergen, p. 107; Malbine, p. 129.) The uncontradicted proof is that the fish factories only begin about the middle of May and cease operations the middle of November (Sternfeld, p. 162; corroborated by Dr. Allen, pp. 98, 99). It follows that the operations carried on at the fish factories can not be the cause of the odors complained of, if these odors prevail during winter as well as during the summer.

2. Moreover, the odors from the fish factories do not travel any distance. Plaintiff's main witness, Inspector Boyle, testified that he has detected the smell from the fish factories only for a distance of 1,000 feet (p. 7). Rockaway Beach, the nearest place to Barren island, is two and one-half miles distant. Mr. Arvine, the expert, testifies that the smell from the prevailing method of boiling fish and drying fish scrap is not offensive, and can not travel any distance (149-153); that the only occasion upon which an offensive odor can arise is when the fish scrap is allowed to get wet, but that even this odor is not carried any distance (p. 153), and that it is impossible for this odor to be smelled at Rockaway Beach (pp. 153, 154).

3. We claim that even if there were any just ground for complaint against the odors emanating from the Barren island establishments, which we deny, the odors from the fish factories are not, under the evidence, the odors complained of.

III.

So far as the fish factories are concerned, the processes carried on at these establishments in the manufacture of fish scrap do not produce any odors injurious to the security of life and health in the adjacent locality.

1. The manufacture of fish scrap consists of the boiling of fresh fish, extracting the oil under pressure and spreading the residuum, called fish scrap, on platforms in the sun to dry. The only odor resulting from this whole process of manufacture is a fish odor, an odor which is natural to the seashore. The fish are caught in the adjacent waters of the bay and sound and are brought in a fresh condition to the factories. It was thrice admitted on the record by the attorney for petitioner (p. 11, minutes of first hearing, and pp. 110 and 163, minutes of second hearing) that the fish are fresh when brought to the factories. We therefore start with this admitted fact. Inspector Boyle, petitioners' witness, himself testifies that the fish are at once emptied into the tanks and boiled *and that none are left on the platform to rot.* (P. 11.) It stands to reason that the boiling of fish and the spreading of the fish residuum or scrap on platforms to dry can produce only a fishy odor, and that such an odor is natural to the seashore, does not travel far and is not injurious to health. This is substantiated in detail by the testimony of the expert Arvine (pp. 149–150). The only condition under which any offensive odor can be produced is, if the fish-scrap is allowed to get wet so that it contains over forty per cent of moisture. In such event the scrap will decompose and liberate an ammonia smell (p. 150), but even this odor is not carried any distance and can not be smelled at Rockaway (p. 153).

2. As to the alleged rotting of the fish-scrap. Inspector Boyle testifies (p. 7) that some of the scrap, "if it lays long and gets wet and the next day is warm, rots." He does not state that this happens often. Now if it be remembered that, as testified to by the expert Arvine (p. 150), and by Sternfels (pp. 160–161), to let the fish-scrap get wet would affect its commercial value by

lessening its ammoniacal elements, that the scrap is sold under an analysis of ammonia, and must contain not less than ten per cent of ammonia and only from ten to twelve per cent of moisture (p. 161), that it would, therefore, be very much to the detriment of the manufacturer to let the scrap rot or decay, then it would seem that the self-interest of the manufacturer would of itself lead him to take every precaution to prevent the scrap from getting wet and rotting. As the farmer will try to prevent his hay from getting wet, and the brickmaker will endeavor to protect his bricks against rain, so the manufacturer of fish-scrap will naturally do all in his power to prevent his scrap from getting wet and decaying. Self-interest will lead each to adopt the best method of preventing his product from deteriorating in commercial value. The manufacturer of fish-scrap gathers up his scrap and covers it with tarpaulins. (Arvine, p. 153; Sternfels, p. 160.) In wet weather he treats the scrap with acid (pp. 150, 160). The objection to treating all the scrap with acid constantly is that this effects the commercial value of the scrap by reducing the percentage of some valuable constituents. (Arvine, p. 154.) In dry weather the proper method is to dry the scrap in the open air under the sun. (Arvine, p. 150.) This method produces no offensive smell, whatsoever. (Arvine, pp. 149, 154.)

IV.

To recapitulate, we claim that the petitioner has failed to establish by a preponderance of evidence that there are any offensive odors emanating from Barren island; that even if it has been shown that offensive odors do come from Barren island, it has not been established that these affect the security of life and health. On the contrary it has been shown that life and health are in no way affected by these alleged odors; that even if any offensive odors do emanate from Barren island they do not come from the fish factories, and that the processes carried on at the fish factories produce no odors injurious to the security of life and health in the adjacent locality.

The manufacturing methods adopted by the fish factories are those prevailing in other establishments of the same kind throughout the country. The great desideratum in order to prevent offensive odors from being produced in the business was to obtain a supply of fresh fish. This has been accomplished by using

steamers for catching the fish. It is, moreover, admitted on the record that the fish brought to the defendant fish factories are fresh. There is, therefore, nothing in the various processes of manufacturing scrap which in the ordinary course of the business can produce any offensive odors. The only condition under which it has been suggested that any offensive odors could arise, is in case the scrap gets wet and rots. Against this contingency the self-interest of the manufacturer is the best safeguard. To require the fish factories to make any radical changes in their present methods of conducting their business would be in effect to destroy their business entirely. They must boil the fish in vats by means of steam, and the natural, proper and ordinary method of drying the scrap is to dry the same in the open air in the sun. The business is not such as will justify any investment in expensive machinery or in costly structures. The business is a useful one, and was established long before the petitioner came into existence. Any interference with the long established methods of this business can be justified only on the ground that they affect the security of life and health, and of this essential fact there is, we respectfully submit, no proof whatsoever.

JACOB A. CANTOR,
JORALEMON & ARROWSMITH,
JOHN FRANKENHEIMER,
Counsel for Fish Factories.

Report upon the Industries Located on Barren Island.

By Arthur Hollick, Ph. B.

New Brighton, N. Y.,
November 24, 1890.

Lewis Balch, M. D., *Secretary New York State Board of Health:*

Sir.— According to instructions I have prepared the following report upon Barren Island and its industries, with recommendations based upon a careful consideration of the facts and circumstances involved:

The island is part of the town of Flatlands, and is situated in Jamaica bay about midway between Rockaway Beach and Coney Island. The nearest point of importance on the mainland of Long Island is Canarsie, with which it is connected by a steam ferry, making about four trips per day each way. The average resident population numbers about 400, but this is increased during the busy summer season, and they all derive their living either directly or indirectly from the factories. All the material used in the factories, and all the products manufactured are shipped by water by way of Rockaway inlet. Large coasting schooners, as well as smaller boats for local traffic, readily find passage to it in this way. Salt water surrounds the island on all sides, and its distance from Coney Island, Rockaway and Canarsie is about four miles from either place. The location would therefore seem to be admirably adapted for the industries located there, not only because all the raw and finished materials can be transported direct by water, thus causing as little nuisance in transit as possible, but also because of its distance from any thickly settled community. Lately, however, residences and hotels have been extended further and further along the adjacent beaches, and regions that were only waste land a few years ago are now being built up and populated. It is mostly from these new communities

and recent accessions that complaints in regard to Barren Island have emanated.

Four firms are located there at the present time, viz.: E. Frank Coe's Fertilizer Works, city address, 16 Burling Slip, New York; P. White's Sons' Horse Factory and Piggery, city address, P. White's Sons, 41 Peck slip, New York; Sternfel's Fish Factory, city address, Barren Island Fertilizer and Oil Works, 170 Front street, New York; Barren Island Oil and Guano Co., city address, 29 South William street, New York.

A discussion of each establishment will be taken up in succession.

E. FRANK COE'S FERTILIZER WORKS.

Fertilizers of various grades are manufactured. The materials used are phosphate rock, fish scrap, sulphate and chlorate of potash, sugar-house scum, etc. The dry materials are mixed with sulphuric acid and the fumes given off from the mixed material is what causes the characteristic odor from this factory. Some years since "sludge" or "spent" acid from the oil refineries was used and the use of this acid undoubtedly was the cause of considerable nuisance. Large covered tanks were constructed and an elaborate system of suction conduits leading to a condenser were provided in order to control the odors arising from it, especially during the process of separating the tar from the acid. How to take care of this tar was a constant problem, as it was a very unwelcome by-product. It was burned in a specially constructed chimney or was mixed with ashes into a sort of concrete and used for filling in along the water front. For about two years past, however, the oil refineries have done the separating themselves, using the tar for fuel, and hence there is no longer any nuisance from this source on the island. The mixing chamber, the galleries through which the freshly mixed material is carried, and the store-rooms are being covered and connected with condensers by wooden box conduits. These condensers will be in the form of tall wooden chimneys fitted up with a series of shelves like fish ladders. A shower of cold water will enter at the top and the vapors will be forced into it from below by means of fan blowers. If the blowers are kept at work and the conduits are properly constructed and maintained in good condition, there need be but very little odor from this establishment. The work of fitting up this system is proceeding

at the present time and I was informed that it would probably be completed in about ten days. It has been Mr. Coe's custom to voluntarily cease mixing about the middle of June and not to resume until the middle of September. This is a wise precaution and should be encouraged, as this is the season when the greatest number of people are located in the vicinity.

There is but little to recommend except that the proposed provisions for controlling the vapors be conscientiously carried out during the entire time that mixing is being done and that no mixing be done whatever during the summer season, from June to September.

WHITE'S HORSE FACTORY AND PIGGERY.

This firm has the offal contract for New York city and is obliged to take away whatever is deposited at the offal dock. Dead animals, offal, condemned meat, vegetables, fish, eggs, etc., dogs from the pound, butchers' refuse, are all received and transported each day by means of their large steam lighter. The animals are all skinned, disemboweled, cut up and cooked by means of steam in closed wrought-iron boilers. The boilers are air-tight and are all connected with escape pipes leading through a cold-water condenser. The pipes then join into a single pipe which terminates under the boiler fires, so that any odors which are not destroyed in the condenser are cremated in the boiler fires. After boiling for about five or six hours the resulting scrap is drawn out, the bones separated and the scrap pressed, after which it is dried in revolving steam-jacketed cylinders. In past years I had occasion to complain that more scrap was being taken from the boilers than could be accommodated in the dryers, hence a large quantity of wet scrap accumulated and had to be stored in an old shed at the rear. During the past year, however, two additional dryers have been provided so that there is now ample capacity for taking care of each day's material. No more wet scrap is allowed to accumulate and the old stock is being dried on a specially constructed platform and will all be disposed of before the coming summer The entire plant for rendering animals and offal now consists of sixteen boilers, six with a capacity of twelve horses, and ten with a capacity of nine horses. Ten horses per day is a fair average of the number received throughout the year, although of course in summer time the number is much greater, but the number of boilers is equal to any emergency, and they are thus enabled to

render all that come at any one time and get them quickly out of the way. So far as the plant is concerned there does not seem to be anything to suggest in the way of improvement, but it is useless to deny that at times this business is highly offensive, more particularly when the cargo is being prepared for the boilers. This takes on an average about two hours daily, and the best that can be expected is that it will be done as expeditiously as possible. The handling of this material is admirably systematized and is so promptly done that it seems hardly capable of improvement. It should be borne in mind that its detention in or near any large city, even for a single day, would be sure to be followed by far more serious consequences and be the cause of more well grounded complaint than could possibly result from the transportation to and treatment at Barren island.

An adjunct to the horse factory is the piggery where there are about 500 pigs which are fed on boiled swill. This swill is obtained from the Windsor, Grand Union, Murray Hill and other hotels. It is removed daily, under contract, and is therefore fresh when put into the boilers. These boilers are covered wooden vats heated by steam and the vapors are carried by a suction pipe to a cold water condenser. The sties are cleaned daily and are kept in excellent condition. Cattle were formerly included in the livestock but none have been there within the past two years.

There is nothing to recommend in the way of improvements in the plant, and my only suggestions would be that the present stock of old wet scrap be dried and removed as promptly as may be and that no more be allowed to accumulate.

STERNFEL'S FISH FACTORY.

This firm is engaged exclusively in the manufacture of fish oil and fish scrap. A fleet of two steamers and three sailing vessels supplies the fish during the season, which lasts from May to November. The particular species utilized is the *Alosa Menhaden*, commonly called "Menhaden" or "moss bunker." About 25,000,000 is considered a fair season's catch. The fish are enumerated roughly by loading them into tram cars of known cubic capacity. The fish are quite uniform in size and are calculated to each occupy a space of about twenty-two cubic inches, hence this method of computation is sufficiently accurate for all

practical purposes. The fish should average about one gallon of oil for every 500, and one ton of dry scrap should represent about 13,000 fish.

As soon as a load of fish arrives they are transferred by means of the tram cars before mentioned to the boilers. These are open wooden vats through which steam is forced. Each kettle has a capacity of about 35,000 fish and the boiling occupies about one-half hour. After boiling the scrap is pressed and then carted out to the drying platforms where it is exposed to the sun until thoroughly dried. The liquids from the presses and vats are allowed to run into settling vats where the oil separates from the water and rises to the surface where it is skimmed off. The water then passes through a series of traps which separate and retain whatever oil has escaped previously. During the process of boiling and drying the distinctive odor of the fish factory is very noticeable. This odor is persistent and may be noticed for miles. When cargoes have been delayed and the fish are not fresh, or when, on account of wet weather, the process of drying has been interfered with, the nuisance arising is very pronounced and this has undoubtedly been the cause of most of the complaints. At the present time the greatest nuisance on the island is undoubtedly the large shed belonging to this establishment, where there are many tons of wet scrap stored, said to have been sprinkled with acid. The stench from this material is highly offensive and can not be mistaken for anything else. I have suggested that vats with covers and suction conduits could be used for boiling, similar to those now in use at White's, for boiling the swill, and I have not heard of any valid objection to the scheme. It also occurred to me that drying cylinders might be used for the scrap, instead of the open-air platforms, but careful inquiry from those who have tried the experiment, has led to the conclusion that this is not feasible. The scrap retains about five or six per cent of oil which the heat can not drive off and this tries out in the cylinder and soon cakes the scrap and clogs the apparatus. Besides this objection, I am informed that under this process such an amount of ammonia is lost that the resulting scrap is almost useless commercially. A suggestion has also been made that the drying might be done under glass, but this would involve a tight building, covering acres of ground, from which the air would have to be exhausted artificially, and this would be practically impossible. Another very

objectionable feature of this factory is its generally dilapidated condition. There are numerous boards missing from the platforms, thereby lessening their drying area very materially, and the floors, platforms, etc., are full of cracks, nooks and corners where old scrap and refuse accumulates and is never removed.

I do not believe that this industry can ever be conducted in an entirely inoffensive manner, but much can be done to mitigate it. In the first place I would recommend that the premises be put in thorough repair, that is, all missing boards in the drying platforms be replaced by new ones, and all openings properly repaired. That the interior of the factory be cleaned; new, tight floors laid, and no open spaces be allowed to remain where refuse could accumulate. Every inch of space on tanks, platforms and floors should be so arranged that it could be reached by a hose and washed thoroughly after each day's boiling. In the second place, tight, wooden covers, with suction conduit attached, should be provided for the boiling vats, and this conduit should connect with a proper condenser. In regard to the drying, I am of the opinion that this must be done in the open air if done at all. I would, however, insist that the amount of fish treated be limited to the facilities for drying, and that during continued wet weather operations cease entirely. There should also be provision made for securing extra help in any emergency, so that no matter how large an amount of material might be received, it could be surely handled before becoming offensive. No more accumulation or storage of wet scrap should be permitted.

BARREN ISLAND OIL AND GUANO COMPANY.

This company is engaged in the manufacture of fish scrap and fish oil, and as the processes and condition are precisely the same as in the previously described factory the same recommendations would naturally prevail.

They employ three steamboats and their plant consists of eighteen vats, having a capacity of 35,000 fish each.

The premises are kept generally cleaner than their neighbor's in the same business, and I have not had to complain of the storage or accumulation of wet scrap.



REPORT ON GLEN COVE STARCH WORKS.



Report on Glen Cove Starch Works.

To the Hon. DAVID B. HILL, *Governor:*

SIR.— On the 4th of August, 1890, the State Board of Health received the following communication:

STATE OF NEW YORK:

EXECUTIVE CHAMBER,
ALBANY, *August* 4, 1890.

DR. LEWIS BALCH, *Secretary of the State Board of Health, Albany, N. Y.:*

DEAR SIR.— Referring to the petitions which you left with me last week, and which relate to the Glen Cove Starch Manufactory, I am directed by Governor Hill to return the papers to you, with his request that you make further investigation into the charge there alleged.

Very respectfully yours.

T. S. WILLIAMS,
Private Secretary.

The petition referred to is as follows:

To His Excellency, DAVID B. HILL, *Governor of the State of New York; and to the Honorable the State Board of Health of the State of New York:*

The petition of the undersigned, citizens, residents and property holders in and about the village of Sea Cliff, Queens county, New York, respectfully shows:

That heretofore in the year 1883, as appears by the fourth annual report of said Board, a petition signed by many residents and property holders in and around said village, was presented to the Governor of the State of New York, showing "that a very large starch and glucose manufactory is and for several years past, has been located and carried on at Glen Cove, by a company known as the 'Duryea Glen Cove Starch Manufacturing Company' and now a part of the organization known as the National Starch Trust; that vast quantities of spent acid and offensive refuse material are continually being produced in the operations of said manufactory and are poured out into the waters of Hempstead bay on the shores of which Sea Cliff is situated; that said acid

and refuse material pollute the waters of the bay to such an extent as to be detrimental to the oyster and fishing interests, and frequently render the water on Sea Cliff shore absolutely unfit for bathing purposes; that the foul stench emitted from said acid and refuse material, and the gases emanating from the same source, so thoroughly permeate the atmosphere as, at times to render respiration oppressive, produce nausea and cause great physical hurt and inconvenience; that the exhalations traceable to the operation of the factory aforesaid, are exceedingly annoying and offensive, and seriously interfere with the enjoyment of life and property; that they are highly prejudical to the sick and destructive to the comfort of those in health, and they have become an intolerable nuisance to the residents and property holders of the aforesaid localities; that the local board of health, although heretofore appealed to by prominent citizens for an abatement of said nuisance, has failed to render your petitioner any relief."

That thereupon an investigation was duly made, and the charges set forth in said petition having been sustained by the proofs, and analysis made under the direction of said honorable Board, the said company, now known as Glen Cove Manufacturing Company, and now a part of the organization known as the "National Starch Trust," was duly directed and required to abate the said nuisance, and for some period of time thereafter did apparently obey the orders of said honorable Board; but that during the present year the same, or substantially the same, improper methods, that were heretofore complained of and condemned, have been resumed by said company, and the evils and offenses and nuisances so heretofore complained of are again very obnoxious, both in the condition of the atmosphere and on the waters and shores of Hempstead harbor, and are directly traceable to the starch and glucose works of the above-named company.

Wherefore, your petitioners pray that your Excellency may be pleased forthwith to require the State Board of Health to examine into said nuisance, and the renewal of nuisances heretofore ordered to be abated on the part of said company with all possible speed, and that said nuisance and the persons or body corporate having control thereof may be dealt with according to law, and that your petitioners may have such further or other relief as may be just and lawful in the premises.

Dated SEA CLIFF, *June* 26, 1890.

(Signed by forty-six citizens.)

Also, the following petition:

GLEN COVE, *July* 25, 1890.

To the Honorable Board of Health of the State of New York, Albany, N. Y.:

GENTLEMEN.— We, the undersigned, permanent residents of Sea Cliff, Glen Cove and vicinity, protest most vigorously against the action taken by some of the summer residents of Sea Cliff to agitate damaging complaints against the starch works, owned and operated by the Glen Cove Manufacturing Company.

By their hostile actions against said starch works, these same complainants commit, what it is their intent to prevent, *i. e.*, the serious depreciation of property values in the villages of Sea Cliff, Glen Cove and vicinity, through the publicity given by their protests against these works, which were operated at the same place, in the same manner, and by the same company many years before Sea Cliff became a village, but on the contrary was nothing more than farm property. We claim:

First. That Sea Cliff is blackmailed as unhealthy and obnoxious by these complaints presented to your honorable board by a few summer residents.

Second. That Sea Cliff is as healthy a place as any part of the United States, which can easily be shown by the vital statistics of the place.

Third. That Sea Cliff has grown from only a few farm houses of twenty years ago, to one of the most beautiful and desirable villages on Long Island, despite the starch industry in our midst.

We, therefore, protest against any action that will bring our villages in undesirable notoriety, and we beg most humbly that your honorable Board will ignore the petition which enters complaints against the starch works, or smells alleged to issue therefrom, as they are unfounded in fact.

(Signed by 108 citizens.)

In accordance with the above directions, the State Board of Health sent experts to examine into the matter, namely: Dr. Maurice Perkins, member of the Board, and Charles C. Brown, C. E., as well as the secretary. The report of these experts will be found appended.

The State Board having duly considered this matter in all its bearings and being familiar with its previous investigation of the

same as set forth in its Fourth Annual Report, hereby respectfully reports as follows:

1. That the complaint of the residents of Sea Cliff against the Glen Cove Starch Works is well founded; that a nuisance of menace and danger to health is created thereby and that the nuisance should be abated without delay.

2. The nuisance is caused by the effluvia arising from the decomposition of the matter contained in the wash-water which is held too long in the basin and which at certain stages of the tide floods the adjacent lands before it has a chance to carry it out into Hempstead bay. The character of this odor is fully described in the engineer's report as well as in that of Dr. Maurice Perkins.

3. The Glen Cove Starch Company should be required to change its method of working so as to provide that the wash-water and wastes from the starch works as soon as they leave the works should, instead of being discharged into the creek, be transported in a covered conduit to a point out in the bay where they can safely be delivered without danger to health; namely, into a large body of water where they will diffuse quickly and where fermentation can be prevented. The "Starch Feed" also should be pressed as dry as possible into bales, kept and transported, the water being squeezed carefully out of it and removed with the wash-water in the manner already described.

To accomplish this end the State Board recommends:

First. That the discharge of waste material of any kind into the creek from the factory should be entirely prevented.

Second. That none of the steeping and settling waters or other substances from the factory should enter the creek.

Third. That all waste fluids and water-carried materials consisting of out-flowings from the factory should be conducted away by means of a perfectly closed tube to a point in the bay where they will meet with such a large body of water as will diffuse them quickly and prevent fermentation.

Fourth. That the starch feed be compressed before transportation, the liquid therefrom being removed with the wash-water.

Respectfully submitted.

THOMAS NEWBOLD,
President.

LEWIS BALCH, M. D.,
Secretary.

ALBANY, *February* 7, 1891.

REPORT OF CHARLES C. BROWN, C. E.

UNION COLLEGE, SCHOOL OF CIVIL ENGINEERING,
SCHENECTADY, N. Y., *September* 24, 1890.

LEWIS BALCH, M. D., *Secretary State Board of Health, Albany, N. Y.:*

SIR.—I have the following report to make of our investigation of the condition of the waters into which the refuse from the Glen Cove Starch Works is discharged:

In company with yourself I visited the works to determine what refuse matters were discharged into the stream, and we found by the statements of the superintendent of the works that the fluids discharged were the same as those discharged previous to the former investigation, the results of which are published in the report of the State Board of Health for 1884 (Fourth Annual), with the following exceptions: The waters from the settling cisterns are run into large wooden tanks, are treated with sulphuric acid, allowed to settle for four hours or so, and the remaining water is run off into the stream. The matter suspended in this water before treatment is principally gluten. An analysis of this water is given in the above-mentioned report. I obtained a sample of the water now run off into the creek after treatment, and the following report of Professor Tucker will show its composition. A comparison of this result with the other will show the amount of improvement in the effluent.

ALBANY, *September* 29, 1890.

DR. LEWIS BALCH, *Secretary State Board of Health of N. Y., Albany:*

SIR.—On the nineteenth instant, I received a jug said to contain waste-water from the starch factory at Glen Cove, N. Y., concerning which, Professor Perkins of the Board had written me that such sample would be sent by Professor C. C. Brown. I have examined the same and would report that when opened by me a few days after the sample was received, the liquid had an exceedingly offensive odor. The smell recalled that of a foul cesspool or privy vault and was in part due to the odor of sulphuretted hydrogen which was subsequently shown to be present. The liquid was opaque and had a yellowish white color and some sediment. It had a slightly acid reaction but contained little free mineral acid. It contains of chlorine (as chlorides), 3.50 parts per

100,000. After proper dilution it yielded 6.4500 parts free ammonia and of albuminoid ammonia 6.9500 parts, showing the presence of considerable quantities of putrescent and readily putrescible nitrogenous matter. On evaporation it yields 359.40 parts per 100,000 of solids having a yellowish brown color, and on ignition blackening and giving off abundant fumes and offensive odors. The loss on ignition amounts to 159.8 parts per 100,000 and the mineral residue remaining to 199.6 parts per 100,000. Such a liquid as this must prove highly offensive and objectionable if exposed to the air or discharged into streams or other bodies of water unless suitable precautions are taken.

Yours respectfully.

WILLIS G. TUCKER.

For ease of comparison, I make a table of the former analyses with the new analysis added.

UNFILTERED.

	PARTS PER 100,000.				
	First.	Second.	Third.	Fourth.	Fifth.
Organic	115.4	714.8	159.8	34.4	*4,338.8
Mineral	74.2	133.6	199.6	59.2	†312.4
Total	189.6	848.4	359.4	93.6	4,651.2
FILTERED.					
Organic	94.8	116.4		20.0	4,284.8
Mineral	68.4	126.8		58.0	311.6
Total	163.2	243.2		78.0	4,596.4
Suspended	26.4	605.2		15.6	54.8
Sulphur	0.7	4.3			†193.0
Reaction	Neutral.	Neutral.	Acid.	Alkaline.	Acid.
Chlorine, as chlorides			3.50		
Free ammonia			6.4500		
Albuminoid ammonia			6.9500		

*Glucose. †Sulphate of lime.

The first is the waste-water from the steeping cisterns of the former report. This was then and is now, I believe, discharged directly into the basin without any attempt at purification. It amounts to 30,000 gallons a day.

The second is the waste water from settling cisterns or starch runs. It was formerly run into the basin without purification. An attempt is now made to purify it.

The third is the result of the present attempts at purification of the second. There is a large amount of this in a day, estimated in the former report at 300,000 gallons. To this is added the fifth, I understand, of which the former report estimates there are about 4,000 gallons a week. The process of purification apparently consisted in running this water, which is charged with gluten and other refuse of the corn, into large tanks, where a certain quantity of sulphuric acid is added. The acid is thoroughly mixed with the fluid by stirring with a machine made for the purpose. The fluid is then allowed to stand about four hours, we were told, and is then drawn off, beginning at the top, and discharged into the basin. The matter settling on the bottom of the tanks is mixed with the "feed" in the bins. A comparison of the treated fluid with the unfiltered specimen before treatment, shows an improvement in its condition so far as the organic constituents are concerned, but a comparison with the filtered specimen before treatment is not so favorable. The purification is not, by any means, complete and soon the organic matter remaining produces such a condition that it is evident the purification is not sufficient to prevent the production of a nuisance. The second and third are not strictly comparable, as the third contains a small amount of highly polluted water in addition, and, moreover, there are probably some differences in the amount of water used for a certain amount of corn, so that the effect of the purifying process could only be definitely determined by comparing analyses of waters obtained at about the same time on the same day. There can be but a small percentage of difference, however, and the general result of the comparison is very nearly correct.

The fourth is the waste-water from the starch tables (third of the former report, and apparently estimated at 100,000 gallons a day). This is, probably, still discharged into the basin direct. It adds a small amount to the existing pollution if that is the case.

The fifth is the waste-water from the filter presses (fourth of the former report, and estimated at 4,000 gallons a week). This is run into the purification tanks as stated above.

In addition to the sources of pollution to the basin mentioned above, there is a small discharge of the feed into the water when boats are being loaded, which amounts to but little, and some discharge of wash-water and refuse from various portions of the starch and soap works, in all but a small amount and, probably, would not be a source of complaint in itself.

The basin referred to is at the head of tide-water in the small creek on one side of which the works are situated. When the tide is low this basin would be nearly or quite dry, if large lock-gates had not been provided to keep the water at or near the level of high tide. This is done to permit boats to lie at the docks alongside the works to receive their loads. The gates are opened at times near high tide to permit the passage of boats. Apparently they remain open until the tide has fallen one or two feet. The lock-gates have small waste-gates in them, which were open at all times that we observed them, and permit of the only discharge of the water from the basin other than that during the early part of the ebb through the open gates as above described. The polluted water from the basin reaches the bay through the creek two or three hours after high tide, and continues to flow into the bay for some minutes after the turn of the tide, until the water in the bay has risen sufficiently to shut in the waters of the creek. This occurs perhaps half an hour after dead low water. The clearer water of the bay then makes its way slowly up the creek, filling the marsh as it goes, but scarcely reaches the basin, so that there is a very small mixture of fresh sea-water with the water in the basin. The amount of fresh-water flowing into the basin over the mill-dam at its head, is very small in quantity, and has but little effect in diluting the polluted water in the basin, except when rains cause the pond to overflow copiously. The consequence of all these facts is that too large a proportion of the refuse waters from the works is retained for a considerable length of time in the basin, and has time to decompose, with the result described in Professor Tucker's report as to odors. These odors are very objectionable, and the amount, I can not doubt, after my experience with them, is sufficient to give just cause for complaint as far away as Sea Cliff, though,

unfortunately, the wind was in the wrong direction at every one of my visits for me to determine the fact by my sense of smell. It is quite possible that the odor from the specimen sent Professor Tucker, was somewhat worse than that arising from the basin, since there is a certain amount of dilution in the basin, though small in amount, and the entire amount of water has not stood undisturbed. The amount makes up for the quality; moreover the action of the sea-water probably hastens the production of the sulphuretted hydrogen, and possibly increases its amount. I was not able to compare the two, but Professor Perkins has, and he states that the odor from the bottle was identical with that in the creek, but when this was poured out into an open vessel, and allowed to stand in the open air for some time, the sulphuretted hydrogen smell disappeared, and was replaced by a smell of old sewage. The water in the creek just outside the gates is somewhat more diluted by the sea-water, but is probably never entirely replaced by it. It adds its portion to the odors arising. There is some deposit of the heavier products of the decomposition on the bed of the creek, but my observation was that this deposit was not in any great amount, and was carried out, except near the upper end of the creek, by the receding tides. It is probably similar to the deposit mentioned in Professor Tucker's report. There was apparently little or no deposit on the marshes through which the creek makes its way. There is doubtless the familiar salt-marsh odor arising from this area, to mingle with the odors from the decomposing starch refuse, but this odor, though containing that of sulphuretted hydrogen, in common with the starch works refuse, is readily distinguished therefrom, and is, so far as my experience with them both at close quarters goes, a very much less objectionable odor in every way.

At different times I have made a number of observations on the currents in the bay at different stages of the tide by observing the flow of the milky water from the creek out into the bay and by observing the course of floats put into the water near the mouth of the creek. I have also gathered some data as to the flow of the currents at different stages of the tide from the fishermen and boatmen met in moving about the bay. The direction of the currents observed after the tide had fallen sufficiently to show in fair strength are shown on the accompanying maps by the lines A, B and C. Line A was indicated by a float put into the water

in the middle of the current at the mouth of the creek about an hour after high tide. The point of turning to the north was estimated from the line of demarkation between the polluted and the clear water which was there well marked as the current from the creek here strikes the main current down the bay and is sharply deflected. The line marked B was shown by a float put in on the south of the center of the current at the mouth of the creek, and close to the shore by light matters and the milky water. It is evident that a decided eddy is formed along the shore at this place and at the stage of the tide mentioned. The current C was indicated by a float put in on the north of the center of the current at the mouth of the creek which ran in the direction indicated by the arrow until it came to an eddy about as shown. Later in the tide the current marked A changes its position nearer to that marked C and possibly swings still more to the east. The approximate area over which the polluted water spreads in quantity sufficient to give a decided milky appearance to the water is shown roughly by the line marked D. It is impossible to mark this area definitely as the location and amount of it vary with the strength of the currents the direction of the wind and other quantities. The area affected by the polluted water is much greater than that indicated as, especially to the north, it is impossible to find a well defined line between pure and polluted water owing to the diffusion of the milky water. The area marked is only that in which the pollution is evidently large in amount, and but little if any diffused. The peculiar odor of the starch works refuse is very pronounced on the area of the bay affected by it and the odors arising from this large area are added to those arising from the other areas mentioned above to aid in producing the nuisance complained of. When the tide begins to flow up the bay the water in the area marked D is carried up the bay on the west of Sea Cliff. It does not always reach the shore south of the Sea Cliff landing but with certain winds it will. Boats lying out from the shore are affected by the gases arising from the polluted water and persons on the boats are discommoded by the odors, during the time from the turn of the tide until the discharge of polluted water from the creek is stopped by the rising tide and the polluted water spread on the bay is carried by them.

The remedy for the nuisance complained of is, I believe, that recommended in the former report on this subject, viz.: "That

all waste fluids and water-carried materials consisting of outflowings from the factory should be conducted away by means of a perfectly closed tube along the right bank of the creek and bay to a suitable distance and proper place for discharge into a vat or receptacle where all such matter should be so chemically treated as to prevent any nuisance, and that the methods for such final disposal of fluid and water should be advised and determined by competent engineers and chemists at the earliest day practicable."

There is no difficulty that is insurmountable in carrying out this recommendation. The only mechanical difficulty is that of securing the flow of the liquid to the place proposed for treatment. This can be readily overcome by pumping, either into the pipe under pressure, or at the works into a pipe laid at such a grade that the liquid shall flow to the place of discharge by gravity. It is evident that the present chemical treatment is insufficient both because it does not remove the organic matters and because it is not applied to all the waste liquids. Other methods should therefore be obtained.

I would suggest as an amendment to the above plan the following: Our observation of the action of the polluted waters in the bay leads me to believe that a sufficient dilution and dispersal of the water to prevent nuisance will be secured if the polluted water is discharged into a current in the bay, preferably below the surface, as soon as possible after treatment and before the organic matters have had time to putrefy. The action of the current, especially if the discharge is below the surface, will be to dilute and disperse the fluids before putrefaction and the attendant nuisance set in. A discharge into slack-water would not answer the purpose. I am disposed to think that the discharge into a properly selected current would obviate the necessity of a chemical treatment of the liquids if solid matters are removed before the discharge.

The hauling of the "starch feed" through the streets of Glen Cove, as well as at the places of delivery for consumption creates a nuisance which could be abated by pressing and baling the feed in some such manner as manure and similar materials are baled for removal from the city. The liquid draining out during this pressing process as well as the liquid now draining out of the tanks should be included in the liquids to be discharged as above recommended. The amount so draining into the basin at present

is not large but the fluid is very much polluted and should be included in the list of waste-waters to be treated as above detailed.

The accompanying map marked "A" is from the former report on this subject. That marked "B" is from the report of Col. D. C. Houston, the officer in charge of the improvement of Glen Cove harbor. I have added to the maps the information derived from our observation of floats at about the middle of ebb tide.

Respectfully submitted.

CHAS. C. BROWN, C. E.

REPORT OF DR. MAURICE PERKINS.

SCHENECTADY, *November* 18, 1890.

HON. THOMAS NEWBOLD:

SIR.—According to the request of the Board, accompanied by Professor Brown, of Union College, I visited Glen Cove, L. I., to examine into the complaint against the starch company.

We arrived there early in the morning when the tide was about one-quarter full.

We took a small boat starting from a float about a mile below the mouth of the creek, into which the effluent water of the starch factory drains.

After we had rowed a few rods, I thought I could detect a slight odor from the water. On wetting my hand, and then my pocket-handkerchief, this odor was quite plain. It resembled that given off by sprouting grain.

This water had unquestionably passed into the creek at the factory, flowed out into the bay with the ebb tide, and much diluted was flowing back towards the creek.

I could not see any difference in the color of this water from that further out in the bay, and do not know how much further out the water was affected.

As we rowed nearer the creek the water smelt stronger, and it was quite perceptible to one leaning over the side of the boat.

We rowed up the creek into a basin bordered on the one side by the buildings of the starch company.

A small stream of fresh-water is held back by a low dam, so as to make a small pond just above the factory. In this I could detect no disagreeable odor.

We were conducted through the works by a Mr. Duryea, who showed us all we asked to see, and answered all our questions.

The method used in making the starch is much the same as that described by Mr. Hollick in 1883, except the way of settling in the large tanks.

Then the various wash-waters were run into deep tanks, and the material in suspension allowed to subside. The cleared water above the sediment was then drawn off and run into the creek.

Subsidence of the suspended matter is now expedited by the addition of sulphuric acid to the mixture in the tanks. The water seems to clear quite rapidly, and the precipitate is added to the so-called "starch-feed" sold to the farmers.

A portion of clear-water was drawn off from one of these settling tanks, and sent to Dr. Tucker for analysis.

In his report he finds a greater amount of solid residue on evaporation than was found in the clear liquid analyzed by Mr. Hollick in 1883.

This difference may be due to some solvent influence of the sulphuric acid, or to the use of less wash-water and a greater state of concentration. Undoubtedly both analyses are correct.

The coarser portions of the grain with such of the gluten and other material that has not been separated or passed into solution, ridded to a considerable degree from its water, is either sold directly to the farmers or stored in frames, the openings of which are covered with burlaps through which some of the water (quite clear) trickles. Some of this water passes directly into the creek, while some of it runs down the sides of the frame to the ground where it becomes very offensive.

The wash-water or clear fluid when it is first run off is not offensive, but, on standing, such changes soon occur as to make it extremely offensive.

When the wash-water sent Dr. Tucker for analysis was first collected, it was clear and odorless. I saw it a few days afterwards at his laboratory. Then it was horrible, giving off a strong smell like rotten eggs (sulphuretted hydrogen) and having become quite milky. A portion which had stood a few hours in an open vessel had deposited a brown sediment which smelt like old sewage.

This same action must be going on at all times when this wash-water is allowed to stand.

All the wash-water from the establishment runs into the basin alongside of it where, of course, it is somewhat diluted, but there is not enough water from the small stream to push it out. The gates at the lower end of the basin are closed during at least half of the ebb and rising tide.

As the tide falls, the level of the water in the basin is lowered (until the gates are closed) and some of the water passes out into the creek. Fermentation sets in, and with the reduced current, this fine sediment settles to the bottom to be caught up and transported to a distance when the gates are opened again.

The water in the basin by the works was bluish black from the suspended sediment in it. It smelt very strongly of sulphuretted hydrogen, large bubbles of which were constantly breaking on the surface of the water, due to the decomposition of the material at the bottom of the basin.

The atmosphere on the basin was vile. The bronze row-locks of the boat becoming black from the sulphide of copper formed.

A steam tug passed us just above the gates of the basin, stirring up from the bottom the same material which I saw afterwards in the open vessel at Dr. Tucker's laboratory. It made the air quite nauseating to one not accustomed to such odors.

It seems to me that people who are so placed in the neighborhood of these works as to smell their odors, have cause for complaint, and the same may be said for those who are within the influence of currents of water which may transport this decomposing matter.

Some method should be found by the company for removing the wash-water as soon as it leaves the works. At this point of the process the water is odorless and innoxious. This is certain to be the case, for when fermenting material comes in contact with the starch, this suffers change and is lost.

If this water is transported so as to diffuse itself quickly into large quantities of ever-changing water, fermentation would not have time to set in, and no odor would arise from the mixture.

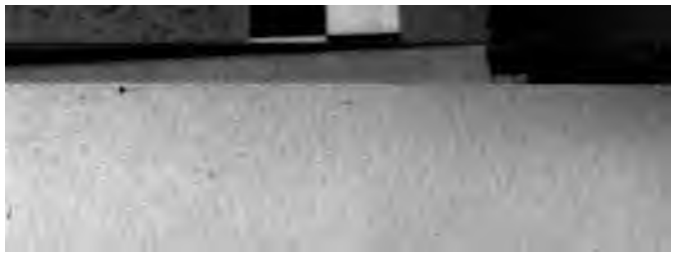
The open and porous character of the so-called "starch feed" expedites and increases the fermentation of the material causing it to smell very disagreeably. I think it should be pressed as dry as possible into bales, kept and transported in this condition. The water squeezed out should be carefully removed with the wash-water.

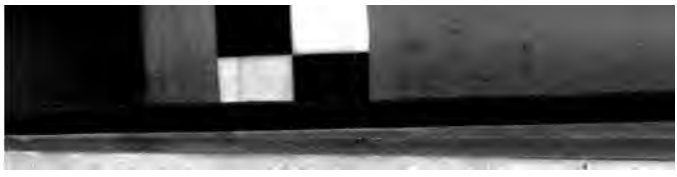
I think with proper care and some expenditure the starch works may be made so that no reasonable complaint can be made against it.

I do not consider myself as very sensitive to odors of this kind, but at the end of the day I found myself with a severe headache. Professor Brown, however, was made so ill that I had some difficulty in getting him to the hotel in New York, where his condition became so alarming that I had to call a physician during the night.

Very respectfully.

MAURICE PERKINS,
Commissioner, State Board of Health.





PLANS FOR SYSTEMS

OF

SEWERAGE AND SEWAGE DISPOSAL.



LANSSTEM

PLANS

FOR THE

Sewerage of the Village of Lansingburgh.

The following are the plans for the additional sewers of the village of Lansingburgh, submitted to the State Board of Health and approved under the provisions of chapter 375, Laws of 1889:

PLANS

FOR THE

Sewerage of the Village of Geneseo.

To the Sewer Committee, Geneseo, New York:

GENTLEMEN.—I send you herewith a plan of your village with sewers laid down thereon.

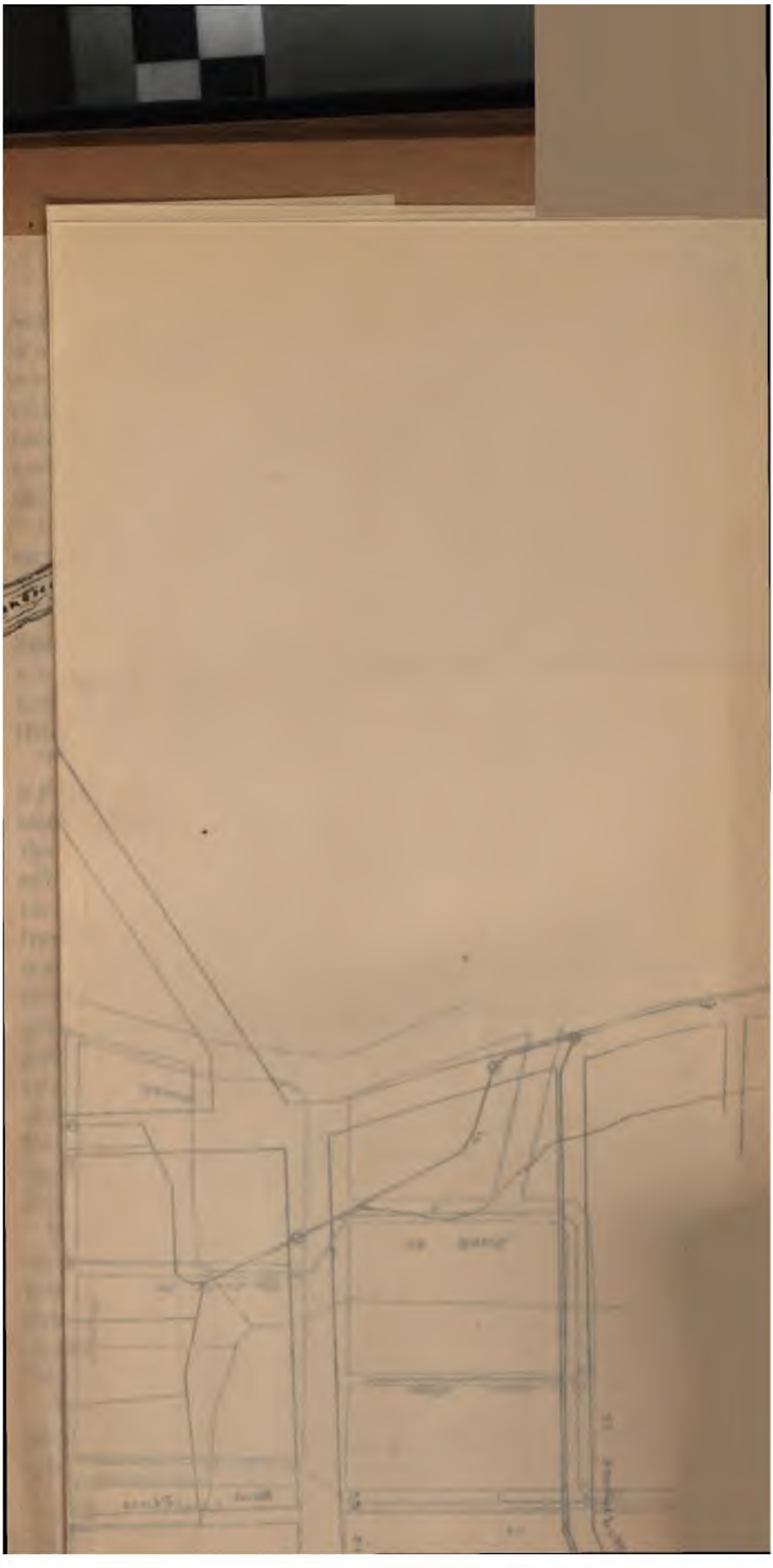
The arrangement is based on information contained in a map of the village and all existing sewers, sent to me by John Young, Esq., C. E., and on Mr. Young's written report concerning the characters of existing sewers, etc.

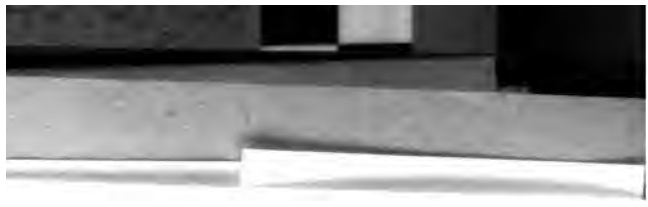
The blue lines on the map indicate the existing sewers; the red lines indicate new work to be done. Solid red lines are laid down where work is to be done in streets now open; dotted lines across blocks show possible future sewers for which calculation has been made in adjusting the sizes of the main lines. This has been done under the assumption that at some future time a substantially equivalent length of street will be required. The margin of sizes of sewers is sufficient to accommodate more than this if necessary.

So far as the present sewers are concerned I should continue to admit surface water to them as is now done, but for all future extensions I would advise admitting no street water; I should admit all of the roof water that the people may desire to get rid of in this way. The falls are sufficient to enable it all to flow through sewers of the sizes laid down.

The existing sewers are, so far as necessary, used for the discharge of the new lines.

A leading feature of the plan is in the interception of the sewage ordinarily flowing across Main street into the north and south gullies; the present foul discharge through these gullies being an important objection to the present work. The sewers reaching Main street, where these two gullies cross it, will continue to carry





both foul waste and storm-water. During storms, their flow is already large and will be still larger when the extensions are made and many more roofs connected. It did not seem worth while to intercept this whole flow, it would have led to the necessity of constructing a large amount of brick sewers and the cost would have been, probably, three times as great as that of the plan adopted.

Provision has, therefore, been made for the interception at Main street of only the dry weather flow and the flow of light rains. During heavier rains the intercepting sewers will still carry all they are capable of receiving; the remainder of the flow, being little more than rain-water and surface wash, will, during the continuance of a storm, pass on as now, down the gullies, but this flow will be so rare and of such short duration and will be so little fouled that there can be no objection to it.

The interception at the north gully is to be made at the gutter inlet at the east side of the street; that of the south gully at the inlet on the west side of the street. The detailed drawings show the manner in which this interception is to be constructed, being substantially by a man-hole carried a foot or more below the flow line of the present sewer, and a ten-inch pipe being carried out from the bottom of it, so that all of the sewage coming to this man-hole, up to the full capacity of the ten-inch pipe, will be carried to the new outlet, surplus flowing on as now through the present line. This relates strictly to the interception of the north gully. At the south gully, as it is desirable there to avoid the possibility of overcharging the sewer below, and as the amount of sewage to be intercepted at Main street will easily be provided for by an eight-inch pipe, the opening into the man-hole is to be made only eight inches in diameter but with a reducer pipe increasing within a length of two feet to ten inches.

The ten-inch intercepting sewer from the north gully runs diagonally to Court street on a line that will clear the sidewalk at the southwest corner of Main and Court streets. As the inclination of Court street is everywhere good, ten inches will give ample capacity for all sewage to be provided for on this line as far as Elizabeth street.

The interception at the south gully should follow a suitable line, avoiding as far as possible the present work, which, although not in good condition, will answer a sufficient purpose for the

discharge of storm-water. It enters Wadsworth street, substantially where shown, follows Wadsworth street to Bank street and Bank street and Elizabeth street to Court street, where it joins the north interception. The flow of both sewers continues through a twelve-inch pipe to a suitable point under the breast of the dam, beyond the wheel-pit of the mill.

At Orchard street, this main receives a branch to which attention is called with reference to the profile. The solid lines there shown are arranged with a view to maintaining the present grade of the street, with a possible surface fill of a foot or so at the lowest point; the dotted lines are suggested as an improvement involving a regrading of the street and the laying of the sewer on an unbroken inclination. Either method will answer a perfectly good purpose.

It is assumed that the sewage of the west side of Main street, north of Bank street, will continue to be discharged, as at present, into the sewer in Wadsworth street, and that the sewage of Bank street, between Main street and Wadsworth street, will be provided for by the present sewer, which, however, should be carried into the new ten-inch sewer as shown. The sewer in Bank street below Wadsworth street, had better be abandoned, and if there are now house connections on that line, they had better be carried across to the ten-inch line.

It is provided, and is considered most important, that at the heads of all of the sewers, new and old, automatic flush-tanks should be placed in order to insure the perfect cleansing of every line at sufficiently short intervals, to prevent putrefaction at any point. It is possible that some of these existing sewers between Main street and Second street are of such low grade and imperfect construction as to make it desirable to use flush-tanks somewhat larger than will be required in the other cases. Ordinarily, a discharge of about 150 or 200 gallons will be ample and there is no occasion to discharge them oftener than once a day. There will be, altogether, about twenty of these tanks and the use of water will not vary much from one gallon per day per head of population. There will be no water used in the village that will do so much good as this will. In the estimate, the cost of flush-tanks for the existing sewers, so far as they do not receive at their heads the flow of other lines, is given in the supplemental estimate, in

connection with the improvements of the existing sewers at points where wood and cement drains are now used on Centre street.

I believe that if the plan herewith submitted is carried out in its entirety, and if the work is constructed according to the specifications and under proper control, the result will be eminently satisfactory. I see no point in which it could be improved so far as the new work is concerned.

Mr. Young says that none of the pipes are laid with cemented joints. I assume this to mean that the joints are filled with clay, which, in a clay soil, will answer a very good purpose; certainly good enough to make it unnecessary to dig down and remake the joints. If, however, these pipes are laid in a porous soil and are not well jointed with either clay or cement, your committee should consider whether or not there is liability of the fouling of cellars or of wells. Except with reference to the cement sewers and wooden box drains, it has not been thought necessary to recommend any material interference with the present work.

This, as will be seen by the estimate of cost, brings the whole improvements within very reasonable limits, and I venture to hope that your village will not hesitate to expend the relatively small amount required to secure this important and necessary supplement to its excellent system of water supply.

As to the construction of the work, while it will be quite practicable to do it piecemeal, it will be more economical and more satisfactory to have it all done under one contract, or by the day under one organization, and under good control. If desired, I can send an expert engineer to assist in laying out the work and to direct its execution until your own engineer shall have become familiar with its details, after which, you will need no outside help. I think you may quite safely depend on the estimate of cost given, and if the work is carried out under proper direction, it will be possible to save an important percentage on this estimate.

The papers accompanying this report are the following:

1. A plan of the village with sewers laid down.

2. Profiles of all new work showing grade, depth and size; where no size is given it is understood that eight-inch pipes are to be used.

3. Detailed drawings showing the construction of man-holes, inspection pipe, flush-tank, and interception at Main street.

4. Specifications showing construction of the work.

5. A detailed estimate of the cost, amounting in all to $23,789.81.

Respectfully submitted.

GEORGE E. WARING, JR.

NEWPORT, R. I., *July* 19, 1889.

ESTIMATE SEWERAGE OF GENESEO, N. Y.

15,040 lineal feet 8-inch pipe at sixty cents	$9,024 00
6,040 lineal feet 10-inch pipe at seventy-five cents	4,530 00
2,010 lineal feet 12-inch pipe at ninety cents	1,809 00
14 flush-tanks at fifty dollars	700 00
12 manholes at forty dollars	480 00
2 interceptions at fifty dollars	100 00
75 inspection pipes at twenty dollars	1,500 00
1 outlet at $100	100 00
	$18,243 00
10 per cent contingent	1,824 30
	$20,067 30
10 per cent engineering, etc	2,006 73
	$22,074 03

Replacing wooden and cement drains on Centre street:

270 lineal feet of 8-inch pipe at ninety cents	$243 00
430 lineal feet of 15-inch pipe at one dollar and fifty cents	675 00
10 flush-tanks at fifty dollars	500 00
	$1,418 00
10 per cent contingent	141 80
	$1,559 80
10 per cent engineering, etc	155 98
	$1,715 78
Total cost	$23,789 81

GEORGE E. WARING, JR.

SPECIFICATIONS FOR SEWER CONSTRUCTION, VILLAGE OF GENESEO, NEW YORK.

By GEORGE E. WARING, Jr., Newport, Rhode Island.

PIPE SEWERS AND THEIR APPURTENANCES.

MATERIALS.

Sewer pipe.— The sewers are to be of the best quality of vitrified pipe, either slip glazed or salt glazed, of the sizes shown on the drawings; each length of pipe to be inspected before being hauled on to the work, and all that are materially out of the true circle, or rough in the interior or imperfect as to spigot or socket (unless at a single point which may be laid at the top) shall be rejected. Pipes having a slight curve may be accepted to the extent to which they can be used in passing curves, but such pipes must have no defect in any part of the spigot or socket that would not come at the top as laid in the trench. Defects of glazing on the outside of the pipe need not reject if the glazing is perfect inside.

Lumps and bubbles on the inside such as would catch fibrous matter must cause rejection. All sockets must be large enough to take all spigots and leave sufficient room for a gasket one-quarter inch thick to be pressed in all around and fully to the bottom, when the pipes are held concentric.

Brick.— All bricks for building flush-tanks or man-holes to be hard burned so as to give a clear ring when struck together and to be true in form. The engineer may, in his discretion, allow half bricks to be used in building man-holes and the domes of flush-tanks, but he may require whole bricks to be used if he considers it necessary.

Cement and mortar.— Mortar must be made with cement in all respects equal to the best Rosendale, if American, and to the best English, if Portland. Sand used in making mortar must be clean and sharp. If not clean naturally it must be washed until it is clean. There must be at least one part of cement to one part of sand in all mortar to be used in jointing pipes unless Portland cement is used, when the proportions may be one of cement to

two of sand. The engineer may order neat cement used when, in his opinion, it is necessary and no extra compensation will be paid therefor. Each barrel of cement must be tested before being used.

All mortar used upon the work shall be carefully and thoroughly mixed dry and wetted up only as needed for immediate use. The engineer may require all such mortar to be thrown away and no compensation therefor will be allowed to the contractor. The engineer and his inspectors will give especial care to the thorough emptying of all vessels in which mortar may be mixed, carried or deposited, to prevent the use of even the smallest portion that has begun to set.

When cement is delivered to the contractor, if not immediately used, it must be protected from the weather and kept dry, and in no case will it be allowed to be placed upon the ground without blocking under the barrels. All cement lost or injured by dampness or otherwise after delivery or acceptance will be at the sole loss of the contractor.

All mortar must be mixed and wetted in a proper vessel or on a tight flooring, and in no case upon the pavement or upon the ground.

Iron castings.—All iron castings must be true in form, of full weight and free from all defects which can, in any way, lessen their usefulness or durability.

Gaskets.—Gaskets will be provided of oakum or jute twisted into ropes of such size as will, when pressed into the joint, completely fill it all around and prevent the least intrusion of jointing material into the interior of the pipe.

TRENCHING.

Lines.—The line of the sewer will be indicated by stubs and grade pegs, set three feet away from it, so that these may remain undisturbed during the work. These must be frequently checked by the engineer as the work goes on. They must be protected by the contractor from all disturbance.

Trenching, bracing, sheeting and flooring.—All trenches may be dug only to such width as is necessary to leave a free space of four inches, at the bottom of the trench, at each side of the socket or ball of the pipe. Wherever the ground from any cause is disposed to cave or slide, it must be supported by proper

bracing. Wherever running sand appears, close sheet-piling must be resorted to, and where the engineer directs, the bottom must be floored. Flooring, when so ordered, and sheet-piling and bracing, when ordered by the engineer to be left in place, will be paid for as an extra at its actual cost. No other lumber will be allowed for in the estimates.

In excavating, if there is a difference in quality in the earth taken out at different depths, the finest and firmest must be thrown to one side, where it will be available for covering the pipes, coarser matter being thrown to the other side of the trench. Under no circumstances are the stubs and grade pegs to be covered up.

The trench must not be opened for more than 200 feet in advance of the pipe-laying, nor left unfilled more than 100 feet in the rear of the pipe-laying.

Water and gas-pipes.— In digging about water service and gas-pipes, workmen must exercise special care, and if any injury is caused by their neglect or carelessness, the cost of repairing must be paid by the contractor and should be by him deducted from their wages.

Grading.— Trenches, except in rock, will at first be excavated to a depth of four inches above the final grade, the remainder of the earth being taken out not more than ten feet in advance of the pipe-laying by men specially selected for skill in grading. The grade of the bottom of the trench will be obtained by measuring down from cross pieces set horizontally in the plane of the tops of the grade pegs, which must be placed not over twenty-five feet apart, the depth of cutting being marked on the stubs; all intermediate points in the grade will be obtained by the use of boning rods from an overhead line parallel to the true grade, tightly stretched between the cross pieces. Should the trench be excavated slightly below grade, it must, if in dry ground, be filled to the true level with sand or with fine dry earth thoroughly rammed to prevent settling.

If excavated much below grade, or if the trench is not dry, the engineer will give his personal attention to the manner of raising it, and his requirements therefor will be strictly complied with without extra compensation, except where flooring is required as above.

Precautions.— All excavations, embankments, rubbish heaps and other obstructions incident to the work must be protected with barricades and lights to prevent accidents to passengers on the streets, and special precautions must be taken to secure the safety of buildings and property near the excavation. All ordinances relating to such precautions and safeguards must be faithfully observed by the contractor, he holding himself personally amenable for any disregard or violation of them by his employés or agents.

PIPE LAYING.

Direction.— In all cases where not otherwise ordered, lay all pipe sewers from the upper end of the line downward. In no case may the sewer be used to drain the ditch. In all wet ditches it will be imperative to bail or pump all water, and in such cases the engineer will not order nor permit pipe to be laid from the lower part of the cut toward the upper.

Inspection of pipes.— In addition to the inspection provided for above, all pipes before being lowered into the ditch must be sounded for cracks, and must be carefully matched, so that when jointed in the ditch they shall form a smooth line of sewer. All pipes found imperfect when delivered at the ditch must be rejected, although they may have passed previous inspection.

Pipes having slight defects which are to be laid at the top are to be clearly marked on the upper side.

Laying the pipes.— Special care must be taken in all cases to lay the pipes to the exact grade prescribed. Gaskets must be, in all cases, packed into the joint so firmly as to hold the pipes in position, and no joint will be cemented until the gasketing of the joint next in advance has been finished. The cement mortar must be so pressed into the space between the socket and the spigot as entirely to fill the same, special care being taken to make a perfectly tight joint at the bottom of the pipe, and the beveled joint at the end of the socket being smoothly and evenly made all around. The cement must be applied at the under side of the joint by the hand, rubber mittens being used. In quicksand and in all trenches from which the water cannot be kept down without constant pumping or bailing, Stanford's patent joint is to be used if directed by the engineer; no extra allowance will be made therefor.

Grading the pipes.— The exact grade of the pipes larger than eight-inch will be obtained, when required by the engineer, by the

use of a straight-edge laid on the inside bottom or flow line of the pipes and running forward to grade pegs set in the bottom of the trench. The bottom of the straight-edge will be leveled to the grade of the sewer, and when resting on each successive pipe and the peg next in advance, the top must be shown by a mason's level to be perfectly horizontal. When this method is not ordered the grade of the pipe will be regulated by measuring down from an overhead line, as above.

Pipes to be laid on full beds.— Before each pipe is put in place, the bottom must be excavated under its end to receive the socket, so that the whole length of the pipe will lie firmly on the graded bottom of the trench. After the joint has been cemented, this excavation must be carefully filled with sand or fine dry earth to support the mortar in its place.

Protecting green joints.— The joint being finished, great care must be taken not to disturb the pipes by stepping on or near them, by throwing earth upon them from the bank, or otherwise.

House branches.— The Y branches for house connections must be laid as nearly as possible at the points indicated by the engineer. After they are laid their exact position must be shown by stakes set at the side of the trench. These Y branches must be so elevated as to bring the lowest lip even with the top of the sewer.

Capping.—The upper ends of all pipes must be closed with brick work or with an earthenware cap or a disk of sheet-iron, and the socket filled with cement mortar. The upper end of each house branch must be closed in like manner, except that the cap will be covered with lime mortar. The filling of the socket must be done at least three days before the branches are to be laid.

Inspection and cleaning pipes.—At such points as the engineer may direct, being at intervals of about 200 feet in the course of all sewers less than ten inches in diameter, two Y branches of the size of the sewer must be inserted, the Y's rising vertically from the top of the sewer and pointing toward each other. These branches to be continued with pipes eight inches in diameter to the inspection head. The distance between these branches to be according to the depth of the sewer, as indicated in the drawing. The flange of the inspection head shall be properly and firmly set on four 4 by 4 posts driven to a firm bearing. After the pipes are connected and firmly supported with earth puddled in with water, fill the space around the head with concrete to protect it

from heaving by frosts or otherwise. The contractor is to pave around it without extra allowance.

Saddle piles.—Where the bottom of the trench is so soft as to endanger the settling of the pipes, they will be supported by saddle piles of inch boards driven firmly into the ground with header and maul, using two piles to each length of pipe. Also, where the ground is naturally hard, but on account of saturation with water, becomes soft and mushy by working, the deepening of the ditch and the use of short piles driven to a grade above its bottom may facilitate and improve the work.

Opening joints.— When removing the caps from the branches to join branch lines with the sewer, great care will be taken to prevent the entrance of earth, mortar, etc., into the sewers.

Closing pipe at night.— When the trench is left for the night, or the pipe-laying is stopped by storms, care will be taken that the end of the line of pipe is closed water-tight with a wooden plug and cement, or with bricks laid in lime mortar.

Back-filling.— In back-filling, great care will be taken not to disturb the pipes or tiles by throwing earth upon them from the top of the ditch, or by walking upon or by the side of them before a covering of at least two feet has been made. After a small portion of the pipes has been covered to the depth of two feet, a man will stand on the filling, and will continue this depth along the whole line by carefully placing over the pipes ahead of him, fine dry earth, shoveled to him by men above. In completing the filling above two feet, the earth will be rammed in layers of about one foot. In crossing streets, gutters, sidewalks, and other places over which there is a great amount of travel, however, more attention will be given to making the filling compact than in unfrequented localities; and where the engineer requires it, a portion of the street will be planked. In filling, the number of men ramming shall not be less than the number of men shoveling.

The pipe-laying, bottoming and first two feet of back filling will be under the immediate supervision of the inspector, who will also attend to the remainder of the filling.

FLUSH-TANKS.

Castings.— The cast-iron siphons and outlet chambers for the flush-tanks are furnished by the Flush-tank Company, 169 LaSalle street, Chicago, Ill.

Construction.— The flush-tank is to be a round cistern, built according to the drawings, with four-inch walls laid in cement mortar, as directed above for pipe joints, with a four-inch dome brought into a neck to receive the cast-iron ring and cover, discharging capacity not less than 140 gallons and not more than 150 gallons, except when larger tanks are specified. The flush-tank has an oblique inspection pipe connected with the upper part of the tank. This oblique pipe should be of the same diameter as the upper end of the sewer. Special care must be taken to make an absolutely tight joint where it passes through the brick wall. To this end, leave a sufficient opening when building the tank and build the pipe in afterwards with great care, using the best cement. So much of the pipe as passes through the wall had better be dipped in a cream of pure cement, making a close film around it for the closer adhesion of the mortar.

The walls being built to the spring of the dome, the bottom of the tank should be properly excavated so as to allow the lower bend of the siphon to be sunk low enough to bring the outlet to the elevation shown. This excavation should then be filled and thoroughly rammed and finished with concrete as shown. It must be absolutely tight. The central pipe of the siphon must be vertical.

When the mortar is firmly set so that the siphon will be readily held in its proper position, the whole bottom of the tank should be covered with cement mortar to its finished level. The outlet should be properly connected with the sewer, and the opening in the brick wall through which it passes should be filled and made perfectly water-tight.

A half-inch pipe connecting with the water supply is to terminate inside of the tank in a half-inch stop-cock, by which the water pipe may be flushed, or the tank rapidly filled. Behind the stop-cock there is to be placed a "pet-cock," or small faucet for the regular feeding of the tank. This faucet should stand a little above the highest water level. When properly adjusted, the siphon will start with a stream of water flowing at the rate of one gallon per ten minutes.

MAN-HOLES.

Man-holes, constructed as shown by the plans, must be built wherever indicated.

All man-holes for brick and pipe sewers must be fully and completely built and fitted with covers as the work progresses

and as each is reached. All man-holes must be built with eight-inch walls and provided with galvanized wrought-iron ladder steps.

UNDERDRAINING.

Wherever the soil is of such a character as to contain ground water at any time at the depth of the sewer, it must be drained by the use of ordinary agricultural drain tiles laid in the trench at the side of the sewer pipe, the laying of the tile progressing as the pipe-laying is completed. These tiles must be laid on a true grade, and their joints must be securely wrapped with muslin torn in strips at least three-inches wide and as long as twice the outer circumference of the tiles. The middle of the strip must be laid under the tile and first one end and then the other must be wrapped completely around the joint. When the tiles are laid, special care must be taken that they be not disturbed in the back-filling of the trench. Whenever necessary to secure proper construction of the sewer, because of the amount of water in the trench, the tiles must be laid by the contractor in advance of the sewer-pipe, and on a lower grade. In such cases, care must be taken to cover the earth with boards, to prevent the tiles from being displaced by the feet of the workmen. Where the tiles cross soft bottom they must be laid on strips of board six-inches wide. The following are the limits of sizes for tiles of different lengths:

For the first 750 feet, one and one-half inches.

For the next 750 feet, two inches.

For the next 1,000 feet, three inches.

For the next 1,000 feet, four inches.

For the remainder of the line, not to exceed 5,000 feet, six inches.

If the smaller sizes indicated are not to be obtained, the smallest obtainable size must be used to the limit given for it. Before the aggregate length of the drain tile shall have exceeded 5,000 feet it must be given an outlet into a man-hole or elsewhere. The greatest care must be taken to keep all earth, muddy water, or improper substances out of the tiles and sewer pipes.

ROCHESTER, N. Y., *November* 15, 1889.

Dr. LEWIS BALCH, *Secretary State Board of Health:*

SIR.—In accordance with your directions, I visited the village of Geneseo, N. Y., on the eleventh and thirteenth instants, for the purpose of examining the plans for the sewerage of said village, and of making a report thereon to your Board. The plans in question were prepared during the past summer by Messrs. Waring, Chapman and Farquhar, civil engineers, of Newport, R. I., and have been duly adopted by the sewer commissioners of Geneseo, by whom they are now submitted to your Board for approval, in pursuance of the provisions of act, chapter 375, of the Laws of 1889. After a lengthy conference with said commissioners, and upon careful study of the data presented, I now beg leave to submit for your consideration the following report:

The village of Geneseo, N. Y., is beautifully situated on the hillside which constitutes the eastern border of the broad valley of the Genesee river, and has, at the present time, a population of about 2,600. Nearly the whole of this population is concentrated upon an area of about 270 acres, although the territory included within the corporation limits is very much greater. An examination of the census records shows that, during the past forty years, the entire township in which Geneseo is located has gained only a few hundred in number of inhabitants; and since its elevated position on a sloping surface, from 150 to 350 feet above the wide plain forming the bed of the valley, is unfavorable for the development of manufactories, it is reasonable to infer that its future growth will not be much more rapid than it has been in the past. Accordingly, if provision be made in the sewerage plans for an ultimate population of about 3,000 upon the said area of 270 acres constituting the present inhabited portion of the corporation, an ample margin will doubtless be afforded. A few years ago a copious supply of wholesome water from Conesus lake was introduced into the village, and is now used in most of the buildings, thus creating the necessity for a system of public sewers, inasmuch as the clayey character of the soil and the generally rapid slope of the surface are not adapted to the absorption of the liquid wastes by means of leaching cess-pools.

A considerable amount of drainage work appears to have been performed in the village, since the map shows a large number of lines of pipe drains which are at present used as sewers. It seems, however, that many of these lines are inconveniently located in private property; also, that they have been laid without reference to any comprehensive plan of sewerage or drainage, and without any attempt to secure either water-tightness or uniformity in grade and alignment. The multiplicity of points of discharge into small runs or natural water-courses on the hillside, and in close proximity to dwellings, is likewise undesirable, especially since the connection of numerous water-closets and cess-pools with old drains. The general character of these drains is clearly exhibited in the appended statement of Mr. John Young, civil engineer, of Geneseo, to Col. George E. Waring, Jr., of Newport, R. I., under whose direction the plans now submitted for approval have been prepared, and hence little more need be said concerning them, except to say that wherever an opportunity for an actual inspection was afforded, their unsatisfactory construction was plainly seen.

In the plan of sewerage designed by Messrs. Waring, Chapman and Farquhar, nearly all of these old drains are retained as sewers in order to reduce the expense of the new system as much as possible, and provision for the interception of the dry weather flow, along with a small amount of storm water, has been made at a number of places. To justify this course, Col. Waring has assumed in his report to the sewer commissioners (a copy of which is hereto appended) "that the joints of the old drain pipes are filled with clay, which, in a clay soil, will answer a very good purpose, certainly good enough to make it unnecessary to dig down and remake the joints. If, however, these pipes are laid in a porous soil, and are not well jointed with either clay or cement, your committee should consider whether or not there is liability of the fouling of cellars or of wells. Except with reference to the cement sewers and wooden box drains it has not been thought necessary to recommend any material interference with the present work." It may be remarked here that although there is no evidence of any care having been taken to fill the joints of the old pipe drains with anything whatever, yet the fact that the surrounding soil is generally of a clayey nature, and the further fact that in most instances the old pipes are at

considerable distances from the tributary dwellings, will mitigate to a large extent the dangers arising from the leakage of the foul liquid wastes into the soil, provided that the wells which are liable to be affected by such leakage be promptly abandoned as sources of potable water. In some cases, also, it will be expedient to make a thorough examination of the old drains where the same are close to the cellars of dwellings, and to relay them properly with tight joints. Under the circumstances, however, and with the exercise of proper vigilance on the part of the local sanitary authorities, there is no practical reason why the experiment of utilizing the existing drains should not be carried out substantially as proposed. It should also be borne in mind that if any of these old drains are found to be unsuitable during the progress of the work, new lines of properly-constructed pipe sewers will doubtless be authorized by the commissioners as soon as the necessity therefor becomes apparent.

The remainder of the inhabited area, not served by the existing drains, is to be sewered on a modified separate system, with vitrified stone-ware pipes, into which the rainfall on the roofs of all buildings may freely be admitted, but from which all other surface drainage is to be excluded. The smallest diameter of pipe used for street mains is given on the map as being eight inches, and the grades are generally quite steep, although in some cases they are reduced to a minimum which will still yield a self-cleansing velocity. In regard to the adequacy of the sizes indicated on the plan to carry off the roof-water, it may be remarked that while they may answer the purpose under present conditions, when but a small proportion of the dwellings will probably have their roof pipes directly connected with the sewers, yet after such a practice becomes general and contributions from larger and additional buildings are admitted, it will be found that the smaller pipes will become engorged from the roof-water, during rainfalls of one inch per hour, in some localities where the grades are necessarily slight. The amount of such water admitted into the proposed new sewers must therefore be restricted, or else the pipes should be correspondingly enlarged in these localities, in order to provide for future contingencies.

To illustrate this latter statement, it may be assumed that the lots have an average width of sixty-six feet, and that three-fourths of the lots on some popular street contain each a building

having a roof surface of 1,200 square feet on an average, the remainder of the lots being permanently vacant. On a length of 792 feet of street there will accordingly be twenty-four lots, and eighteen such roofs having an aggregate area of 21,600 square feet, or about one-half acre, from which the whole of the rainfall will quickly be concentrated by the gutters and conductors. Now a rain having an intensity of one inch per hour, which is by no means unusual in this locality, gives a precipitation of about one cubic foot of water per acre per second, hence on the said half-acre of roof surface there would then fall about one-half cubic foot of rain-water every second, all of which would quickly be discharged into the sewer, if the proper connections were made therewith; and we would therefore have, on this basis, a volume of one-half cubic foot of roof-water per second for every length of 792 feet of street. But as the pipes should not become overcharged under this condition, inasmuch as the rainfall often exceeds the rate mentioned for short periods of time during a shower, and as the discharge of a few flush-tanks may also occur at the same time, it will doubtless be fair to assume that on such a residence street as above described, a volume of one cubic foot of roof-water, sewage and flushing water combined, may be expected per second from a length of 1,200 feet. Applying this moderate estimate of quantity to the case of the proposed ten-inch pipe in Second street, between Oak street and North street, which has a grade of one in 400, and an extreme discharging capacity of about 1.3 cubic feet per second, we perceive from the map that said pipe may eventually be required to carry off the discharge from an aggregate length of about 4,000 feet of eight-inch sewers in tributary streets, whose combined flow, as aforesaid, would amount to 3.3 cubic feet per second. On the other hand, if the future streets indicated upon the map are never laid out, the length of the tributary sewers would be only about 2,200 feet, and the total combined flow would become 1.8 cubic feet per second, on the same basis as before. It will therefore be seen that either said pipe should be somewhat larger than ten inches in diameter, or else that the amount of roof-water admitted should be restricted.

The foregoing is only a single instance selected from several other cases which might be cited where an unlimited admission of roof-water may in the future overtax the capacity of the pipes specified on the map; and the subject is herewith presented merely

to direct attention to the fact that the discharge of the rain which falls upon the roofs into the system of small pipe sewers under consideration is liable to cause engorgements hereafter, and to the desirability of establishing proper restrictions in the outset with reference to the admission of such roof-water. As already stated, the pipes specified will doubtless be fully adequate to serve the purpose mentioned so long as the existing conditions of population continue to prevail, but after a more complete development of the district is effected, it will probably become necessary to enlarge some of the sewers. The question of the future growth of a village like Geneseo, after the introduction of an excellent public water supply and a comprehensive system of sewerage, offers room for much debate, and it should be thoroughly discussed by the local authorities, in order that errors in the sizes of the sewer pipes may be avoided as far as possible. From a financial point of view, it is not always expedient for a small community to construct its public works with reference to a large future growth, and in preparing his plans, an engineer must be governed to a great extent in this respect by the judgment of the residents and public officials. In the present case, the opinion seems to be quite general that no great increase of population can reasonably be anticipated, and hence it may be said that the sizes of the proposed new sewers are generally sufficient.

For the maintenance of cleanliness in the entire system of sewers, an automatic flush-tank is designed to be placed at the head of every line of pipes, both new and old. On the new lines, the capacity of these tanks is to be about 150 or 200 gallons each, and the discharge is to take place once per day; but on the old lines, it is intimated that somewhat greater capacity may be required, in case that the said drains have low grades and are imperfectly constructed, which latter element is extremely probable. These provisions are essential to the successful operation of the system, and it may be added that for the flushing of the old drains much larger and more rapidly discharging tanks will undoubtedly be needed than for the new sewers, inasmuch as the former are generally in a leaky condition and of relatively large diameter. No definite volume can, however, be at present assigned for the necessary flush in these cases, and it will, therefore, be expedient to determine the same experimentally during the progress of the work.

A notable feature in the plan submitted is the absence of man-holes in the lines of new sewers east of Second street. The estimate, however, provides for a large number of inspection pipes, which are not designated on the map, and which, with the flush-tanks, will afford the necessary means of ventilating the sewers. Concerning the utility of man-holes, otherwise than for purposes of ventilation, little need be said here, since it is merely a question of economical maintenance of the sewerage system, on which great diversity of opinion prevails. Should it be found desirable to introduce man-holes in place of the said inspection pipes at any time hereafter, the change can readily be made without interfering with the use of the sewers; and as the essential element of ventilation is apparently provided by a sufficient number of inspection pipes, the omission of man-holes in said portion of the system may be disregarded in the present case.

My attention was also called to the proposed method of intercepting the dry-weather flow in the series of old drains which now discharge into a small ravine crossing Main street about 250 feet south of Court street, whereby a depth of excavation of about twenty-six feet, mostly through shale or slate rock, will be required for a distance of about 350 feet. Against this plan nothing can be urged except the expense involved thereby; and if a considerable reduction of cost by a slight alteration of the manner of interception is deemed important, it may be accomplished by constructing a new ten-inch pipe sewer for a distance of about 250 feet in shallow cutting along the northern bank of said ravine, from Main street easterly to the junction of the two main lines of old drains shown upon the map, and there intercepting the ordinary discharge of said system of drains, instead of at Main street. The feasibility of this method was fully demonstrated by the levels recently taken by Mr. John Young, civil engineer, at the writer's suggestion; and from the data thus obtained, it was found that the invert of the old drain at said junction could easily be placed, by relaying and raising a short length of the two branches, at an elevation 9.5 feet below the level of the surface of Main street at the ravine culvert. With this elevation, the invert of the said ten-inch intercepting sewer might be placed about 1.3 feet lower at said junction, and by allowing it a grade of one in 300 for the distance of 250 feet mentioned, its invert would be 11.6 feet below the surface of the

roadway in Main street at said culvert, instead of 26 feet, thereby saving a large sum for rock excavation. Both of these plans of interception accomplish exactly the same end, so far as the public health is concerned, and the only choice between them lies in the difference in cost, which must be decided by the sewer commissioners.

The outfall of the proposed system of sewers is the Genesee river, just below a mill-dam, as indicated upon the map. This point is, in my opinion, not favorably located for the discharge of crude sewage, as a large eddy exists here which will tend to induce a deposit of the suspended matter along the east bank of the river, in close proximity to a large mill and a few dwellings. A much better point of discharge can be secured a few hundred feet further down the stream where the course of the latter is straight and the current more rapid. As to the suitability of this mode of sewage disposal no valid objections can be raised, since the minimum flow of the river is always large enough to insure an odorless dilution of the relatively small amount of sewage discharged into it. To give some idea of the minimum flow of said river, it may be mentioned that reliable gaugings at Rochester indicate a summer discharge of about 6,000 cubic feet per minute, with probably at least 4,000 cubic feet per minute at Geneseo; and as the volume of crude sewage from the village will hardly exceed twenty cubic feet per minute, it will be seen that the minimum dilution will become fully 200 fold. Between Geneseo and Rochester there is, furthermore, only one other mill-dam, which is located at York, twelve miles down the river, and since the stream is nowhere used as a source of potable water supply, there can be no general sanitary reason for anticipating a serious nuisance in consequence of the discharge of the sewage as proposed.

In conclusion, it may accordingly be stated that the execution of the plan of sewerage submitted by Messrs. Waring, Chapman and Farquhar will, in my opinion, accomplish satisfactorily the purpose designed, provided that the point of discharge into the Genesee river be changed as above suggested, and that some restriction be placed upon the admission of the rain-fall on the roofs of the buildings served. The other matters mentioned are chiefly financial considerations, which can safely be left to be decided by the responsible local authorities. With respect to the significance of the separate system, its operation, advantages and disadvantages, the sewer commissioners appear to be fully con-

versant, and they also are aware of the necessities and attention required by the retention of the existing old drains as an integral part of the plan proposed. The abandonment of the majority of these defective old drains to the simple function of discharging storm-water, would, in my opinion, have been more in consonance with modern views on sanitation; but as so much expense has already been incurred in their construction, and as the volume of foul matter which is at present discharged therein is quite small, it has been considered expedient to make use of them in the manner proposed until the absolute necessity of building new lines of sewers has been demonstrated.

Respectfully submitted.

EMIL KUICHLING,
Civil Engineer.

UNION COLLEGE,
SCHENECTADY, N. Y., *February 6*, 1890.

LEWIS BALCH, M. D., *Secretary State Board of Health, Albany, N. Y.:*

SIR.— I have the following report to make of my investigation into the subject of the discharge of sewage into the Genesee river by the village of Geneseo.

There can be no doubt that all streams should be preserved sufficiently free from sewage contamination to permit their use for any purpose for which they are naturally fitted, unless, in some few cases, their value as carriers of sewage greatly outweighs their value for other purposes, to which sewage pollution is inimical. Even these streams must be kept in such condition that they will not give rise to nuisance. Whether any given stream shall be kept in its original state of purity by the exclusion of sewage or not; and if sewage is admitted, the amount thereof, the degree of purification and the time at which processes of purification must be applied, are questions which must be answered for each stream individually, upon a thorough examination into the uses to which the stream can be put, the amount of flow, the drainage area, population thereof, village and city population, systems of water-works and sources of supply, systems of sewers, manufacturing and mining plants and other users of water and sources of pollution, relative cost of purification and of damages to present users, etc., etc. The results of this examination will serve as a basis of

information upon which to lay out a definite policy for the given stream to which to hold the inhabitants as closely as possible. In most cases it will be found proper to lay out a policy of restriction of pollution, but in some cases the enforcement of this policy may be delayed for a greater or less length of time as more definitely stated below.

I have, of course, been unable to make a thorough examination of the drainage area of the Genesee river in the short time at my disposal therefor at this juncture, as it would involve an inspection of the whole watershed and a collection of all the detailed information upon the general subjects indicated above. This report can therefore only give such general information as I have been able to gather, but may be sufficient, upon which to base a decision as to what disposal shall be made, for the present at least, of the sewage of Geneseo.

I estimate roughly from a rather inaccurate map that, according to the United States census of 1880, there were about 222,000 inhabitants upon the watershed. Of this number 89,000 were in the city of Rochester, below which the water is not used for any purpose demanding the preservation of its pristine purity, leaving 133,000 upon the watershed outside the city. Of these, about 50,000 were in villages and hamlets, leaving 83,000 scattered country population. Thirteen thousand were in villages on the river and 37,000 in villages on its tributaries. Thirty thousand were in villages which now have a population of 1,000 or more each, and 17,000 were in villages having systems of water-works. But one of these villages, so far as I know, draws its supply of water from the river, and that is the farthest up stream of any village directly on the river. A few of these villages have nearly or quite doubled their population since 1880, owing to the establishment of the salt industry and to one or two other special causes, and the estimated average increase of the villages having water-works is about thirty per cent. If we estimate the other villages to have increased fifteen per cent and the country population to have remained practically stationary, we shall have the following figures for the population in 1890:

Total on watershed	274,000
In Rochester (estimated)	130,000
Total on watershed outside of Rochester	144,000
In villages and hamlets	61,000

Country population	83,000
In villages and hamlets on the river	16,000
In villages and hamlets on tributaries	45,000
In villages having 1,000 population or more each	38,000
In villages having water-works	23,000

The statements of increase in population that I have found are but estimates and are probably too large, but they will doubtless be reached before another decade has passed.

I am not aware that any village on the watershed has at present anything like a complete system of sewers. Probably most of them have a greater or less number of lines of pipe laid for drainage or sewerage of small areas. One village besides Geneseo is now agitating the subject, viz., Wellsville, on the upper waters of the river. So far as I know, Wellsville is the only village drawing any portion of its water supply from the river direct, as above stated. There is hardly a village below Wellsville that is likely to use the river as a source of water supply, as nearly all are at some distance from, or above the river, or both, and have more convenient and economical sources in lakes, creeks, springs or wells. As above stated, only about one-third of the total village population can be considered as on the river, as that term is above defined, the remaining two-thirds being on tributaries at distances of say one mile to twenty miles from the Genesee. Some of these latter villages must put in purification apparatus with systems of sewers, because local conditions will require it. I have no knowledge of any use to which the river is now put which will be injuriously affected by a moderate amount of sewage pollution.

Mr. Emil Kuichling, C. E., states that "reliable gaugings at Rochester indicate a summer discharge of about 6,000 cubic feet per minute." Should the entire village population be concentrated at this point and have a complete system of sewers, the maximum flow would be about 100 cubic feet per minute for each 1,000 of such population. Mr. Rudolph Hering, C. E., in a paper before the American Public Health Association (already quoted by me in another report) states his conclusion that a flow of 150 to 200 cubic feet of water per minute in the stream for the sewage from each 1,000 people draining into the stream is a sufficient dilution to render the stream inoffensive, to preserve it fit for all ordinary manufacturing purposes and to sustain the life of fish, provided

that there is opportunity for a natural subsidence of the heavier matter immediately below the town discharging the sewage If we accept this statement, it is evident that the sewage from this concentrated population should be purified before discharged into the river. Should each one of these villages have a system of sewers in its present location, the case would be somewhat different, as we should have the sedimenting and purifying effect of the miles of flow in the stream or its tributaries through rapids, falls, ponds and dams, and it is probable that purification of sewage would not be necessary to preserve the above standard of purity. When we eliminate from the problem those villages which will be obliged to resort to sewage purification from local reasons, we will reduce materially the amount of sewage pollution and render purification of the rest unnecessary. To reduce the case to the present circumstances, we have no complete sewer systems, probably a small amount of raw sewage discharged directly into the river or into any of its tributaries, and hence it seems quite unnecessary at this present time to require sewage purification of any of the villages on the watershed for the general purpose of preserving the purity of the river.

It is quite apparent, however, in the above discussion, I think, that when the time comes that many or all of the villages have sewer systems, and the population in sewered villages approaches the limits mentioned, sewage purification must be resorted to as a general rule over the whole watershed. That time is in the future but it will certainly come. It is possible, also, that an inspection in detail may reveal other reasons why sewage purification should be required. It would not be advisable, therefore, to permit the unrestricted discharge of raw sewage into the river, but if the discharge is permitted in the case of Geneseo, it should be with the express stipulation that sewage disposal works be constructed if at any time found necessary. A financial reason for postponing the erection of disposal works in such cases as Geneseo until their desirability is more clearly apparent, is the saving of the interest upon the cost of the same and of the cost of attendance thereon during the years (probably many) until their use should be adopted.

I must beg your indulgence for any errors of fact in the preceding statements. The sources from which I draw my information (since a detailed inspection can not now be made) are various,

not very accordant, and some of them confessedly not accurate. I think, though, that the general idea obtained is very nearly correct, and that corrections of detail will not materially alter the general conclusions.

I agree with Mr. Kuichling regarding the position of the outlet below the eddies. If it were necessary to discharge through the dam, Mr. Waring has without doubt chosen the best place of discharge, but it is not necessary, and there is, I think, a certainty that there will be a certain amount of deposit of solids from the sewage on the shores and on the bottom to be uncovered at low water, if it is placed there. The water was high at the time of my visit and a few minutes watching of ice and other floating matter demonstrated the possibility. Whether the tendency to deposit would be greater or less at low water, I have no present means of knowing. My opinion is that it would be greater.

Respectfully submitted.

CHARLES C. BROWN,
Civil Engineer.

GENESEO, N. Y., *June* 29, 1889.

Col. GEO. E. WARING, *M. Inst. C. E., Newport, R. I.*

SIR.—Your letter of the twenty-seventh was received to-day. In reply:

There are no drain tile put together with cement in the village. The sewer pipe is all of it vitrified tile, except the short sewer on the north end of the village as marked on the map.

The sewer on the south side of Center street is not in good order. The tile are all sound and good, but as you will see by the reference to the map it is very shallow. The people, however, who live between Temple hill and Prospect street claim that there is four feet drop from the cellars to the sewer. The wooden box commencing at Prospect street is in good order, the one commencing at Second street is not in good repair.

I did not make any inspection of the sewer from the south end of Main street westerly to Wadsworth street, but it is in bad order.

The culvert at the north end of Main street is in good order. The one at the south end has been repaired within a few years

and was originally laid in cement. It is constructed of rubble walls covered with flagstones, and is three feet horizontally and four feet vertically.

The drainage on the west side of Main street, from the culvert on the north end of the street to a point about fifty feet south of Ward place is carried westerly across the lots to Wadsworth street. The sewers have been put in by the persons interested.

The rest of the sewers are in good condition, and have been put in with a good deal of care.

JOHN YOUNG,
Civil Engineer.

NEWPORT, R. I., *June* 30, 1890.

Board of Sewer Commissioners, Geneseo, N. Y.:

GENTLEMEN.— Referring to our interview of the twenty-fifth instant, I beg to say, as an amendment of the record:

(1) That I modify the course to be followed in intercepting the main sewer at North Main street by beginning the interception at the east end of the culvert, and carrying it along the north bank of the ravine to connect with the Court street line at a point which will give a fall, on the intercepting line, of not less than one to 400.

(2) I amend the line of the main outlet by leaving the original line at a suitable point after crossing the railroad, running through the mill property near to the corner of the mill, thence down to a point where the line will strike the ledge, thence through a cut in the rock deep enough to allow a concrete filling to cover and protect the pipe, running diagonally to the deep channel in the rock at the point selected.

(3) I leave the question of running one or two sewers on North (?) street to be decided according to levels and other considerations to be hereafter determined.

(4) If the sewer down Oak street is to be built now, I see no objection to making that the outlet for the sewer originally shown as crossing the head of that street.

Respectfully submitted.

GEO. E. WARING, JR.

GENESEO, LIVINGSTON COUNTY, N. Y.
September 6, 1890.

State Board of Health, Albany:

GENTLEMEN.— We forward you to-day map showing slight changes in the line of sewers from plan previously approved. The reason for that at the north end of Main street is explained in accompanying report of Colonel Waring. Those in the center and south end of Main street were to avoid crossing private property.

Very respectfully yours.

W. A. WADSWORTH,
President Board Sewer Commissioners.

PLANS

FOR

Sewerage and Sewage Disposal, Village of Holley.

The village of Holley is situated in the extreme eastern part of Orleans county, upon what is known as the east branch of Sandy creek. The entire village, with the exception of perhaps a dozen houses, lies on the west bank of the creek and at an elevation of seventy to 100 feet above it.

The present population is about 1,200. In 1880 it was 1,050, and there is nothing to show that the rate of increase will be any greater for the next twenty years or more. It will, therefore, be safe to say that its population will not exceed 1,500 during the next twenty years.

The village has at present no water supply; but a contract has recently been made by which the village is to be furnished within a few months with a complete system of water mains.

One large stone sewer running across the public square and emptying into the old canal, is the only public sewer in the village. There are, however, a number of private "drains" which run in all directions and empty into a variety of places, such as surface depressions, the Erie canal, ditches, street gutters, etc., the object of each seeming to be to remove the sewage from its owners' premises.

Sandy creek is the only available natural outlet for the sewage of Holley. Its water shed above the village is about thirty square miles, which area would furnish during the dry months, according to the usual calculations, about 200 cubic feet per minute. Actual gauging during the last week of September, 1889, show, however, 540 cubic feet per minute, exclusive of any waters from the Erie canal. (This excess can be readily accounted for

by the fact of the unusually heavy rains during the preceding months of July and August.) This discharge is increased at times during the summer months by overflow by the canal.

About three miles (by the creek) north of Holley a dam has been built to hold back water to furnish power for a flouring mill in the little village of Sandy Creek about a mile further down stream. The creek which at this point flows through a comparatively flat and very wide valley, is set back for more than a mile from the dam and although it is not materially widened by the introduction of this dam, its banks are low and are covered with the usual low vegetation common to such places.

The village of Sandy Creek contains perhaps 200 people, and the creek flows nearly through the center of it. A short distance below it is joined by its "West Branch" and its size considerably increased. About three miles below Sandy Creek, the stream flows through a small village called Kendall's Mills. At this point it is also obstructed by a dam.

From Kendall's Mills it flows unobstructed to Lake Ontario, a distance of six or eight miles.

An examination of the creek below Holley shows that at many points trouble would be caused by placing into it even a quantity of sewage much less than would come from the village of Holley. For example: Just above the first mentioned dam, here for two miles the creek flows nearly parallel with, and not more than one or two hundred feet from a highway, upon which are many dwellings; some within fifty feet of the creek. It is evident that sewage lodging along the banks at these points would cause trouble, not only by gasses thrown off by its decomposition, but wells, many of which are near the creek, might be contaminated by it.

Therefore it is evident that in designating a system of sewerage for the village of Holley, a method must ultimately be provided for the more or less thorough purification of the crude sewage before discharging it into the creek.

The general plan of the system we propose may be briefly stated as follows:

The plan provides for a separate system of sewers, with the exception that a small amount of surface water from one particular locality is to be admitted.

The outfall for all that portion of the village north of Jackson street is a point near the East Holley road bridge, from which

point the sewage is to be carried across the canal in iron pipes, and on to a filtration field, the filtrate being drained into the creek.

The outfall for the portion south of Jackson street is a point on Batavia street near an old skating rink, and as that portion is quite small its sewage for the present is to be disposed of by way of the creek.

DISCUSSION.

A study of the topography of the village shows that at only two places is it at all necessary to dispose of surface water by aid of the sewers. With these two exceptions the streets are all of nearly uniform grade and slope in such directions that storm-waters are readily carried on the surface into the canal or creek, and without causing the least trouble.

The first of these two exceptions just mentioned is a small area lying between Albion and Hickey streets and the New York Central railroad. This area can be readily drained by digging the open ditch as indicated on the plan, and lowering the culvert on Albion street. The second exception is a small basin in the vicinity of Van Buren street from which surface water must be taken in pipes. It is from this basin, whose entire watershed is less than eighteen acres, that surface water is to be admitted to the sewers.

That this is justifiable, in an economical point of view, will be seen by the following:

The total length of sewer, as designed, the size of which is affected by admitting this surface water, is in round numbers, 5,000 feet. The average size being 11.6 inches, with average cost of pipe of thirty cents per lineal foot. If the surface water were not admitted the average size for this 5,000 feet would be 7.6 inches, with average cost of pipe of sixteen cents per lineal foot. The saving in pipe is therefore fourteen cents per lineal foot, or for the 5,000 feet, $700. Thus, by excluding the surface water, $700 has been saved in cost of pipe, and the saving from other sources we can safely say would not make the whole over $1,000.

Now, the cheapest way to drain this basin independently is into the old canal, which, although it may be admissible, is not lawful when sewage is discharged. This would necessitate laying about 2,500 feet of pipe of at least fifteen inches diameter, at a cost of nearly, if not quite, $2,000. Thus, by admitting the surface water, about $1,000 has been saved in the cost of a complete system.

This surface water is to be admitted, through surface sewers provided with catch basin, at three points, viz., corner Albion and Van Buren streets, corner Van Buren and Jackson streets, and corner Van Buren and Gedde streets. The greater part being carried through the Gedde street sewer, the lesser part being carried through the Jackson and Thomas street sewer connecting with the Gedde street sewer on the public square, the route from that point, which may be called the main sewer, being through White and Canal streets to the outfall near the bridge.

SIZE OF PIPE.

In determining the dimensions of pipe to be used for that portion of the sewers which are to be constructed on the separate plan, three classes of territory were considered, viz.:

I. That in which the lots had an average frontage of sixty-six feet. One dwelling on each lot containing five persons, using on an average, eighty gallons of water per head per day; the maximum discharge into the sewer being at the rate of 160 gallons per head in twenty-four hours. Under these conditions there would be delivered into each 100 feet of sewer, 0.22 cubic feet of sewage per minute.

II. In which lots have a frontage of fifty feet, with one dwelling containing on average seven and one-half persons, each using 100 gallons of water per day; the maximum delivery into the sewer being at rate of 200 gallons per head in twenty-four hours. Under these conditions 0.55 cubic feet per minute would be the maximum delivery into each 100 feet of sewer.

III. In which there are forty persons to each 100 feet of sewer, each using 140 gallons per day, with maximum of 250 gallons, 0.92 cubic feet per minute, would then be the maximum discharge into each 100 feet of sewer.

The following is the subdivision of streets according to the three classes:

I. Albion, west of Van Buren, Hickey, Orchard, Jackson, Main south of Gedde and north of Franklin, Canal, Ray, Franklin, Perry, Whippo and Gedde west of Main.

II. Thomas, Albion east of Van Buren, and Main from Gedde to Franklin.

III. Public Square, Wright, White, State and Batavia.

Table 1, shows the computations in tabular form.

In computing the dimensions of those sewers which are to carry surface water, the areas tributary to each sewer were first determined, these are shown on the plan by colored boundary lines, and are marked I, II and III.

One inch per hour was assumed as the maximum intensity of rain fall, of which twenty-five per cent would reach the sewer from area I; and from areas II and III, since their general slopes are much smaller, twenty per cent was assumed as the maximum amount to reach the sewer from these areas. To these quantities thus determined was added the amount of sewage to reach the sewers, as determined by the classification before given.

In computing the quantities in the column headed "Cal. D," the formula $V = C \sqrt{R. S.}$ was used, taking of co-efficient C values found by Kutter's formula with N = .011 and reducing them five to fifteen per cent according to size of pipe.

The sewers which are to carry surface water were calculated to run full, and those carrying only sewage one-half full.

Under the column headed "D used," the sizes of pipe to be used in the system are given. The sizes range from six to fifteen-inch. The larger amount being six-inch, which we think if properly laid and maintained will be amply sufficient.

TABLE SHOWING DISCHARGE AND COMPUTED DIMENSIONS OF SEWERS.

[Q.= Discharge in cubic feet per minute. D.= Diameter in inches.]

STREET.	Block.	Dist.	Sine of slope.	Class.	Comp. Q.	Trib. Q.	Total Q.	Cal. D.	D. used.	Q.	D.
Albion	West of Hickey	480	.012	1	1.06		1.06	2	6		
Albion a	West of Hickey	420	.005	1	.92	1.06	1.98	3	6		
Hickey	Gedde-Albion	740	.007	1	1.62		1.62	2½	6		
Albion	Hickey-Orchard	850	.005	1	1.87	3.60	5.47	4¾	6		
Orchard	North of Albion	350	.008	1	.77		.77	2	6		
Albion	Orchard-Van Buren	150	.007	1	.33	6.24	6.57	4½	6		
Van Buren b	Albion-Gedde	550	.005	1	1.21	66.57	67.48	8¾	9	7.78	6
Gedde	West of Van Buren	560	.023	1	1.23		1.23	2	6		
Gedde	West of Van Buren	200	.005	1	.44	1.23	1.67	3	6		
Gedde c	Van Buren-Main	650	.005	2	3.57	190.65	193.72	13	15	13.72	6
Main	Albion-Gedde	430	.021	2	2.36		2.36	3	6		
Gedde	Main-Public square	525	.020	2	2.88	196.08	198.96	9¾	10	18.96	6
Jackson	West of Van Buren	600	.015	1	1.32		1.32	2	6		
Van Buren d	Gedde-Jackson	450	.005	1	1.00	54.00	55.00	8	9		
Jackson e	Van Buren-Main	675	.022	1	1.48	97.12	98.60	7¼	9		
Main	Gedde-Jackson	400	.022	1	.88		.88	2	6		
Thomas	Main-Public square-Gedde	775	.005	2	4.25	99.48	103.73	10	10	3.86	6
Public square	Gedde-White	185	.005	3	1.66	302.69	304.35	15¼	15	29.47	8
Wright	West of Public square	440	.025	3	3.96		3.96	3	6		
White	Public square-Canal	670	.003	3	6.03	308.31	314.34	17	18	39.46	10
Canal	White-Albion	200	.005	2	1.10	314.34	315.44	15¼	15	40.56	9
Albion	Ray-Canal	1,680	.018	2	9.04		9.04	4¾	6		
Canal	Albion-Canal cross	625	.016	1	1.37	324.48	325.85	13	15	58.97	9
Ray	Albion-Franklin	675	.013	1	1.48		1.48	2	6		
Franklin	Ray-Main	500	.005	1	1.10	1.48	2.58	4	6		
Main	Franklin-Perry	85	.006	1	.46	2.58	3.04	4	6		
Main	Albion-Perry	600	.020	2	3.30		3.30	3½	6		
Perry	Main-Whippo	520	.015	1	1.14	6.34	7.48	4¼	6		
Whippo	Albion-Perry	600	.015	1	1.32		1.32	2	6		
Perry extended	Whippo-Canal	620	.024	1	1.36	8.80	10.16	4½	6		
Main	Franklin-Union	250	.020	1	.55		.55	2	6		
Union	Main-Canal	940	.013	1	2.07	.55	2.57	3¾	6		
Main	Union-Corporation line	700	.010	1	1.54		1.54	3¼	6		

Canal extended	Main-Union	1,300	.006	1	2.86	1.54	4.40	4	6 to 10		
Canal	Union-East Holly road	440	.004	1	.97	6.97	7.84	5	6 to 10		
Canal	East Holly road to crossing	80	.006	1	.18	18.00	18.18	7	8 to 10		
Canal	Crossing	330	.005			344.03	344.03	15	15 tile and 16" iron	69.13	10
Canal	Crossing to filtration field	250	.047				100.00	6	8		

a Scant velocity; with c=60, v=1.5. *b* 60 cubic feet of surface water. *c* 120 cubic feet surface water. Depends on future grade of Van Buren street. *d* Admit surface water from 4¾ acres=64 cubic feet per minute. *e* 40.8 cubic feet surface water. †Total surface water as per table=228 cubic feet. Total surface water as corrected=274.4 cubic feet. Difference in cost for this combined and all separate system=$1,350, taking pipe at one-half list price. 1. For remaining 228 cubic feet surface water per minute by pipe 1,500 long at 5=1-300 and 1-60, each one-half way requires 750′ (15″) at seventy cents=$535; 750′ (12″) at fifty-eight cents=$435; total, $960. 2. For remaining 275 cubic feet surface water per minute, same as above. 750′ (18″) at ninety-five cents=$712.50; 750 (12″) at fifty-eight cents=$435; total, $1,147.50.

N. B.—This is the table as corrected by Emil Kuichling, and the last two columns show the quantities and diameters necessary, if surface water is excluded.

By the table it is seen that the maximum discharge of the outlet sewer is 297 cubic feet per minute, of which 228 cubic feet is surface water. That part of this may be excluded from the filtration field a storm overflow is to be placed in the man-hole just east of the canal, and so regulated that only 100 cubic feet per minute can reach the filtration field. The balance passing by way of an overflow sewer to the creek.

FLUSHING.

One hundred and fifty gallon flush-tanks are to be placed at the head of each sewer. Their capacity of discharge to be equal to that of the sewer into which they empty, and so regulated as to discharge at least twice in twenty-four hours.

Circular or elliptical man-holes, substantially constructed of brick will be placed at every change of grade or alignment.

Hand-holes will be placed at intervals of 100 feet on all six and eight inch sewers.

By the present plan the sewage from that portion of the village south of Jackson street is to be disposed of by way of Sandy creek. As the population on this area is not more than 100, and it will in all probability be many years before there is any material increase, this was thought advisable. If, however, in the future the growth of the village extends south of the railroad, and the tributary population to this outfall becomes much greater, then the sewer on Batavia street can be relaid so as to carry the sewage to a point near the corner of State and Batavia streets, from which point it will be taken through an iron pipe laid in the bottom of the old canal to connect with the main outlet near the bridge.

To insure the safe working of this iron pipe, which would necessarily be laid at a low grade, it is to be connected to the water-main by a by-pass, said by-pass being furnished with a controlling gate, by which water direct from the mains with their full force, if necessary, can be forced through it.

It will be noticed that the pipes have all been kept within the bounds of the streets, with three exceptions. The first being a short sewer running about 200 feet south of Thomas street, and parallel with it. As the houses on the south side of the street are much lower than those on the north side, it is thought best to do this rather than put the sewer in the street low enough to accommodate both sides, which would cause considerable

increase in expense for excavation. The other two exceptions are from the corner of Perry and Whippo streets to Canal street, and from North Main street near the corporation line to corner of Union and Canal streets. No provision for right of way has been made in these cases, for it is considered that inasmuch as house branches will be put in as the sewer is constructed, the land owners will be glad to avail themselves of the opportunity to open a street upon which the sewers are already in place.

Inasmuch as the sewer from North Main street to corner of Union and Canal streets will be the outfall for all the sewage from the northwestern part of the corporation, which at present is not built up but is fast being so, it has been made much larger than would be necessary for the amount of sewage it will have to carry for the present, however, if when it becomes necessary to lay this pipe it has not tributaries enough to fill it, it can be made smaller. Because there is no way of telling at present just what size will eventually be required, it is thought best to call for a ten-inch, with the above proviso.

DISPOSAL.

The Massachusetts State Board of Health have been experimenting for nearly two years, on various methods of filtration of sewage, and their experiments practically indicate that on properly prepared filtration areas the sewage of at least 1,500 persons may be permanently purified for each acre of such area. Mr. Rafter has recently visited their experimental station at Lawrence, and the method of filtration we suggest was originally proposed by him.

This method consists in pouring crude sewage intermittently upon a nearly level tract of land, which has been covered with a depth of from three to five feet of clean, coarse sand, and allowing it to filter through, the filtrate being drained off into the nearest water-course by a system of under drains which are placed say two feet below the surface of the ground before the sand is placed upon it.

The experiments at Lawrence show that not only will the filtrate from such a sand bed be as pure as the average drinking water, but that probably all disease germs may be removed.

This "sand filtration" is the method of disposal we recommend, and, to be on the safe side, we propose to prepare one and one-half acres in this way, which it is believed will be amply sufficient to dispose of the sewage of Holley for a number of years to come.

The accompanying sketch shows a cross section of the proposed field, as divided by slight embankments for intermittent filtration. The field is to be located as shown on plan, and the filtrate led off into the creek as indicated.

The following detailed estimate of the field is given in order that its cost may be compared with other methods of disposal:

Estimated cost of filtration field, three and one-half acres of land, at $100	$350 00
One thousand six hundred cubic yards of grading and embankment, at twelve cents	192 00
Seven thousand two hundred and sixty cubic yards sand in place, at twenty-five cents	1,815 00
Four thousand linear feet (three-inch) tile, furnished and laid, at thirty dollars per 1,000 feet	120 00
Four thousand linear feet trenching for tile drains, at two cents	80 00
Eight hundred linear feet effluent pipe, furnished and laid	231 00
Fencing	51 00
Field complete	$2,839 00
Add for contingencies	281 00
Total	$3,120 00

Estimated cost of settling tanks and covers for winter disposal:

Twenty-eight thousand feet board measure (plank for covers, winter drains), at twenty dollars	$560 00
Six thousand feet board measure in settling tanks, at thirty dollars	180 00
Forty cubic yards excavation for tanks, at thirty cents	12 00
Fifty cubic yards clay puddle, at one dollar	50 00
Two (four-inch) stop-gates, at ten dollars	20 00
Two (eight-inch) stop-gates, at twenty-two dollars	44 00
Four stop-gate boxes, with stops and springs, at ten dollars	40 00
Cost pan, pipe and specials, furnished and laid	100 00
One additional man-hole	20 00
Miscellaneous small fittings, screens, etc.	100 00
Preparation of small filter area for deodorizing sludge	50 00
One thousand feet board measure boards in deodorizing shed, pits, etc.	30 00
Amount	$1,146 00
Add for contingencies	144 00
Total	$1,290 00

It is evident that the first cost of the work for this method of disposal is much less than that for any other method yet proposed, also the cost of maintenance will be small, being at most only a small proportion of the salary of one man who will look after the whole sewerage system, and cost of replacing a small amount of sand each year, and as the experiments at Lawrence have demonstrated beyond a reasonable doubt the practicability of the scheme we have for these reasons recommended it for your approval.

The detail plans which we submit show also the method of preparing the filtration area for use during the winter.

In conclusion we wish to say that we are aware that the successful working of the separate system depends in a large degree upon the accuracy of its mechanical construction and it is our intention that the sewers in this system shall be constructed with the greatest care, the best quality of vitrified (*i. e.* impervious) pipe being used, and laid with perfectly water-tight joints, to exact grade and alignment.

Respectfully submitted.

WALDO & DODGSON,
Engineers.

ROCHESTER, N. Y., *November* 20, 1889.

In further commending the system of sewerage as designed by Messrs. Waldo and Dodgson for the village of Holley, N. Y., the undersigned desires to especially call attention to the method of sand filtration and to the discussion of the same in the recently published twentieth annual report of the Massachusetts State Board of Health, in which it is stated that full detail of the experiments which have been made by that board will be given in a supplement to be published soon, to which attention is also especially directed.

GEORGE W. RAFTER,
Consulting Engineer.

ROCHESTER, N. Y., *December* 6, 1890.

Dr. LEWIS BALCH, *Secretary State Board of Health:*

SIR.—In accordance with your directions of October 11, 1889, to examine the plans submitted for the sewerage of the village of Holley, Orleans county, N. Y., I beg to state that

arrangements were made for a visit to the village on October twenty-first, in order to learn both the topographical peculiarities of the locality and the views of the sewer commissioners with respect to extent of work and choice of system of sewerage. This examination was duly made, and in the course of the investigation it was decided that some further details and descriptions of the proposed plan should be prepared and submitted to me by the local engineers, Messrs. Waldo and Dodgson. These additional facts, together with the final map or plan of the contemplated work, were placed in my hands only a few days ago, and I now beg leave to submit for your consideration the following report:

The village of Holley is located on the west bank of a small stream, called Sandy creek, which flows in a deep ravine northerly through the town, and empties into Lake Ontario, fourteen miles distant. The present population is about 1,200, and, in the judgment of the sewer commissioners, no great increase is to be anticipated in the future. At the present time the village has no public water supply, but a contract has recently been made whereby it is soon to be provided with a copious supply of water for domestic use.

With the exception of one large stone drain running for a short distance in Gedde street, and across the public square into the old Erie canal, no public provision for the removal of storm water and house wastes has yet been made, although a number of private drains discharging into the ravine, the canal, and natural depressions tributary thereto, are in existence. The general slope of the surface is easterly or northeasterly toward the creek; but as the original Erie canal was located along the west bank of the ravine for a considerable distance before crossing over to the east side, and is still retained as an adjunct of the enlarged canal, the surface drainage from nearly the entire inhabited district now finds its way into the canal prism, as will be seen from the map.

The Erie canal cannot, however, be made the recipient of the sewage from the village, and hence in the design of a system of public sewers another outfall must be secured. Sandy creek is the only natural outfall which is available, and it has accordingly been selected for this purpose in the sewerage plan under consideration.

Its drainage area above, or south of the village, is said to be about thirty square miles, and during the last week of September, 1889, its discharge was gauged at 540 cubic feet per minute, exclusive of any water obtained for milling purposes from the Erie canal. This flow is doubtless much in excess of the usual flow in dry seasons, which will probably not exceed 150 cubic feet per minute. The volume coming from the canal, although usually large, cannot fairly be considered, since the same is liable to be cut off at any time by reason of accident or scarcity of supply; and the creek must therefore be regarded independently of the canal. Assuming a prospective population of 1,500 in the village, with a water supply of twelve cubic feet, or ninety gallons per head per day, of which supply one-half is consumed or converted into sewage in six hours, we will have a maximum sewage flow of twenty-five cubic feet per minute, with a minimum flow in the creek of about 150 cubic feet per minute, thus making the volume of sewage about one-sixth of the dry-weather discharge of the creek during such period of six hours per day, while during the remaining eighteen hours, the sewage will amount to only one-eighteenth of the discharge of the creek. Were the sewage flow uniform throughout the day, it would be about one-twelfth of the said volume of the creek.

In view of the small discharge of the stream in seasons of drought, the disposal of the sewage in a crude state into it will be attended with serious risk of dangerous pollution, even though the water should not be used for drinking; and this risk is further increased by the fact that the stream is dammed at a point about three miles north of Holley, in order to furnish power for a flouring mill in the hamlet called Sandy Creek, and that a second dam for a similar purpose is located about four miles further north at a settlement called Kendall's Mills. By both of these dams the water is set back for a long distance in the channel, and although the width of the latter is not materially increased thereby, yet the velocity of the current is greatly reduced in these elongated, deep pools, in consequence of which the suspended matters discharged from the sewers will be afforded opportunity to settle, and eventually to create an offensive nuisance by their decomposition. There are, moreover, numerous other small pools, formed by irregularities in the channel between Holley and Lake Ontario, in each of which a similar sedimentation would take

place; and as there are many dwellings near the creek, both in the two above-mentioned settlements and along the banks for the remainder of the distance to the lake, it is obvious that some method of sewage clarification must soon be provided.

The necessity for such a procedure is recognized also by the local engineers, Messrs. Waldo & Dodgson, whose plan contemplates the collection of the sewage in a system of small pipe sewers, and its concentration and filtration at a single point near the northeastern corner of the village, with the exception of an insignificant amount derived from a small and low district near the southeastern corner. It is assumed that for the present, this latter amount may safely be discharged directly into the creek without treatment; but if it should ever prove to be a nuisance, it may discharged into a long line of six-inch cast-iron pipe, to be laid in the bed of the old canal from Batavia street to the main outlet sewer crossing under said canal near the East Holley road, by which it will be delivered at the purification works along with the rest of the sewage. Provision for flushing this line of iron pipe directly from the contemplated water-mains is also to be made, and with the use of the projected temporary outlet into the creek in the emergency of an obstruction in said pipe during the season of navigation in the canal, ample security for the efficient removal of the sewage from the low district will be afforded. In this connection, it may be remarked, that the mode of procedure shown upon the map or plan is not expedient; and in its place I would suggest the entire abandonment of the proposed outlet (F A) at the rink on Batavia street, and the construction of the sewers in Batavia and State streets to such grades as will unite in a common outlet (E B), from which the sewage can be turned into the aforesaid six-inch iron pipe, or temporarily into the creek by a suitable pipe laid from (B), down the side of the embankment of the old canal.

The method of purifying the sewage proposed by the engineers is that of simple filtration through sand, and they have prepared their design on the basis of certain experiments conducted by the State Board of Health of Massachusetts at Lawrence. Without attempting to discuss the practical merits of this process of sand filtration, as performed at Lawrence, it will be sufficient to state that the same plan has been tried many times on a much larger scale in England years ago, and has been abandoned in favor of other methods. To quote from Professor Henry Robin-

son, one of the foremost English authorities on the subject: "In many places efforts have been made to remove the impurities from crude sewage by artificial filters, or strainers, formed of various materials, such as straw, burnt clay, charcoal, coke, ashes, sand, gravel, broken stone, etc. The glutinous character of sludge (or the sediment from the sewage) invariably clogs the filtering material, which then ceases to be operative, and a nuisance is created by the accumulation and decomposition of the foul matter on the filter. The difficulty in disposing of the offensive solids thus collected, together with the cost of constantly cleansing and renewing the filtering material, has led to this system being regarded as impracticable except on a comparatively small scale and under favorable circumstances." Numerous other authorities might be cited to the same effect; but to avoid argument I submit merely the opinion that under a hot summer's sun, a slightly neglected filter-bed covering an area of one and one-half acres, as proposed in this case, will be extremely liable to give rise to an offensive effluvium, which will become intolerable to the people whose dwellings are near to the projected works. The filtration scheme must therefore be regarded as an experiment, which can doubtless be made successful from the standpoint of purifying the sewage, but which may prove, in its maintenance in our climate, much more expensive than appears to be anticipated. However, inasmuch as the ultimate necessity of clarifying the crude sewage, before discharging it into the small creek, has been duly recognized in the project, the further consideration of the details of the process to be employed may now be omitted.

In planning the network of sewer pipes in the streets of the village, the engineers have assumed that sewage only will be admitted from the greater portion of the district, and that from the remaining twenty-three acres of low territory included between Albion, Van Buren, Jackson and Hickey streets, a liberal amount of surface drainage water, together with the sewage, shall be removed by the new sewers. A strict "separate" system of sewers is therefore designed for the greater part of the village, and a "combined" system for the said low area. The same purpose can also be accomplished by a strict separate system for the whole area, and a special storm water sewer or drain from which sewage shall be excluded, extending from the low area above mentioned

to either the old canal or the creek. The engineers have, however, adopted the plan described, on the ground that a saving of at least $1,000 can be effected over the cost of the strict separate system with the said special storm-water sewer. A revision of their estimates, on the other hand, shows that such is not the fact, and that a few hundred dollars may actually be saved by the adoption of the latter plan. This discrepancy is due to the fact that through an oversight, no allowance was made by Messrs. Waldo & Dodgson for the surface drainage from a considerable area designated upon the map as thus served, and that therefore the size of some of their main sewer-pipes is smaller than necessary; also that the length and cost of the special storm-sewer has been overestimated. Probably there will be a little difference in cost between the proposed combined plan and the one just suggested; but in view of the fact that by the latter method all citizens will be subjected to the same restrictions and rules with respect to the use of the sewers, also, because the cost of a storm-overflow at the projected filtration bed will be saved, and because the general management of the entire system will be simplified, the second plan is herewith recommended.

The streets in which I have deemed it expedient to alter the sizes of the sewers from the dimensions computed by the engineers, even if their general plan of sewerage be retained, are as follows: Gedde street, from Van Buren to Main streets, to be fifteen inches instead of twelve inches; Van Buren street, from Gedde to Jackson streets, to be nine inches instead of six inches; White street, from public square to Canal street, to be eighteen inches instead of fifteen inches; Canal street, from Albion street to the Erie canal crossing, to be fifteen inches instead of twelve inches, and the cast-iron pipe under said canal to be sixteen inches instead of fourteen inches. These changes are made in consequence of the omission, above mentioned, to take into account about fifty-four cubic feet per minute of storm-water coming from an area of 4.5 acres at the junction of Van Buren and Jackson streets. The basis of estimating the quantity of such storm-water adopted by the engineers, is that one-fifth of a maximum precipitation of one inch of rain per hour will find its way from the surface into the sewers during the progress of the shower, thus giving a volume of about one-fifth of a

cubic foot of rain-water per acre per second, or twelve cubic feet per minute. From another small district of about 4.3 acres along Albion street, a rate of fifteen cubic feet per acre per minute was adopted, since the ground here sloped somewhat more rapidly towards the sewer. These estimates are justifiable, in my opinion, since the streets of the district are not provided with pavements, and large areas of open garden land occur; but it is not expedient to go much below these figures in areas of such small magnitude, and hence the corrections referred to have been made.

With regard to a special storm-water sewer for the service of the said low area of twenty-three acres, and the removal thereby of a maximum estimated volume of rainfall of 275 cubic feet per minute, the following facts may be of interest. The drainage may be effected either easterly from a point on Van Buren street, midway between Gedde and Jackson streets, to the old canal, or it may be carried in a southeasterly direction to the present culvert under Batavia street, near the rink, and thence into the creek. By the first route, the distance as scaled from the map is 1,650 feet, and a large stone sewer or drain is already in existence for a portion of the way; to carry off the water, an eighteen-inch pipe on a grade of one in 300 will be required for a distance of not more than 750 feet, while for the remainder of the length, a grade of one in sixty with a twelve-inch pipe will suffice. By the second route the distance to said culvert near the rink is 1,410 feet and the same sizes of pipe will be required as before. The former route is the present, and probably also the natural, course of the surface drainage; and both routes extend for considerable distances through private lands. To carry the water from Albion street through Van Buren street to the head of the suggested special sewer, pipes of from nine to twelve inches in diameter will be sufficient where open gutters cannot be used. It will thus be seen that the surface-drainage problem is here not a difficult one, and that a strict separate system may easily be provided for the sewage, with no greater expense than is involved in the plan submitted.

An examination of the other grades and sizes of the pipe sewers, as marked upon the map, shows that the same are generally sufficient with two exceptions. These are the sewers extending from the north line of the village southeasterly across private land to the intersection of Union and Canal streets, and in Canal street from Union street to the East Holley road. In the former case, the

slope or grade is one in 350, which is too light for a six-inch pipe, whereas there will not be water or sewage enough to secure a proper velocity or flow in a ten-inch pipe, and in the latter case the grade is one in 435, with but little more water, so that the same objections will apply. The proper remedy is here to depress the pipe extending across the canal a few feet, and thus secure at once the necessary falls for the above-named sewers. It may also be remarked that a grade one in 200 for six-inch sewers will hardly suffice to insure therein a self-cleansing velocity, which should be at least three feet per second; but, as well built sewers of this size and grade have proved satisfactory in other localities, the experiment of using such light gradients with small pipes, may, perhaps, be justified. There is, however, no absolute necessity for resorting to these limiting grades in the present case, as an abundance of fall can generally be secured at the expense of a little deeper excavation through the low ridges; and to insure the more successful operation of the small separate sewers, it is urgently advised that such extra expense be incurred.

The provision of flush-tanks and man-holes in the system proposed is adequate in all respects, and with the exceptions above noted, the plan submitted is worthy of much commendation. It may also be mentioned that all of the above-named points were brought to the notice of the sewer commissioners at the time of my visit to the village, and that the relative merits of the various systems of sewerage were fully discussed. This attitude appears to me to be necessary in view of the fact that patents on the separate system, both by itself and in combination with the admission of limited quantities of storm-water, have been granted to certain parties, and hence disagreeable complications are likely to arise after the completion of the work or during its progress, unless the local authorities are conversant with the matter. The validity of these patents on a system of sewerage has not yet been definitely determined, so far as I am aware, and, therefore, it places a disinterested reviewer of such a plan of sewerage in a somewhat embarrassing position, and compels him to leave the choice of system to the local authorities. Appended hereto are the reports and map of Messrs. Waldo & Dodgson.

Respectfully submitted.

EMIL KUICHLING,
Civil and Sanitary Engineer.

REPORT

ON THE

Sewerage and Sewage Disposal, Village of Albion.

ROCHESTER, N. Y., *July* 18, 1890.

To the Honorable Board of Sewer Commissioners of the Village of Albion, N. Y.:

GENTLEMEN.— We have the honor of submitting to you this, our report, on a design for a system of sewerage for your village, together with the maps, profiles and drawings connected therewith.

We think it proper to state here that this report is not intended for a treatise on sewerage works or sewage disposal, but is only intended for a business document, which will set forth, in a business way, what we deem most advisable for the sewerage, drainage and sewage disposal for your village.

A careful study of the topography of the village in connection with the existing sewers shows that, as far as the drainage of surface water is concerned, the town is fairly well equipped. A great deal of time was spent in looking up and tracing out the existing sewers, and we believe we succeeded in locating all the most important ones.

Some of these old sewers were found in very poor condition, and badly in need of repair and cleaning. This necessity for cleaning has been brought about in a large degree by the very bad practice of placing the surface sewers directly over the main sewer, thus allowing a large amount of earth to be washed in at every shower. As sewers needing repair and cleaning, we would mention those on Park and West State streets. These sewers are not only badly filled with dirt, but have very low grades. In some

places as low as .10 of a foot in 500 feet, and in another place the sewer is level for a distance of 250 feet.

Still another difficulty with these sewers is, that they are nearly on a level with bottoms of the cellars which drain into them. It is evident then that the cellars on Park and West State streets are not well drained. The remedy is to deepen the sewers and straighten their grades, which can be readily done, as there is plenty of fall between their summits and outlets.

The map shows that these are the only localities where damp cellars are liable to occur, and, as far as we have been able to learn, they are the only ones from which complaints have been heard of that difficulty. In the other portions of the village the natural slope of the surface is such that storm-waters are readily carried through existing sewers and ditches to their natural outlets.

The fact then that surface drainage is not needed having been clearly established, we need only to consider a system of sewerage which will dispose of the house sewage and drainage; hence the system we submit is what is called the "separate system."

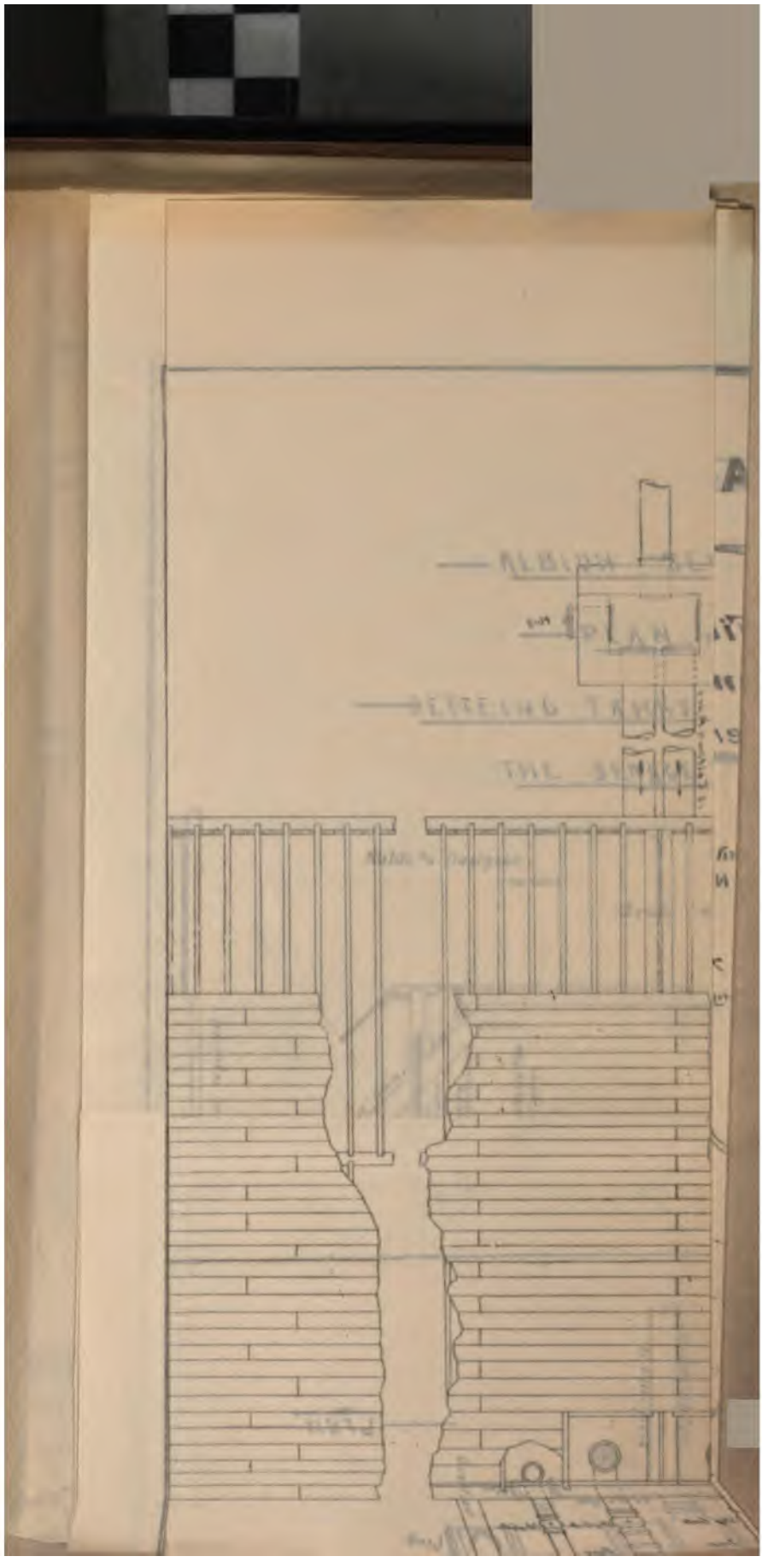
Leaving the question of outlets for discussion further along in this report, we will briefly discuss the net-work of sewers for that portion of the village south of the canal.

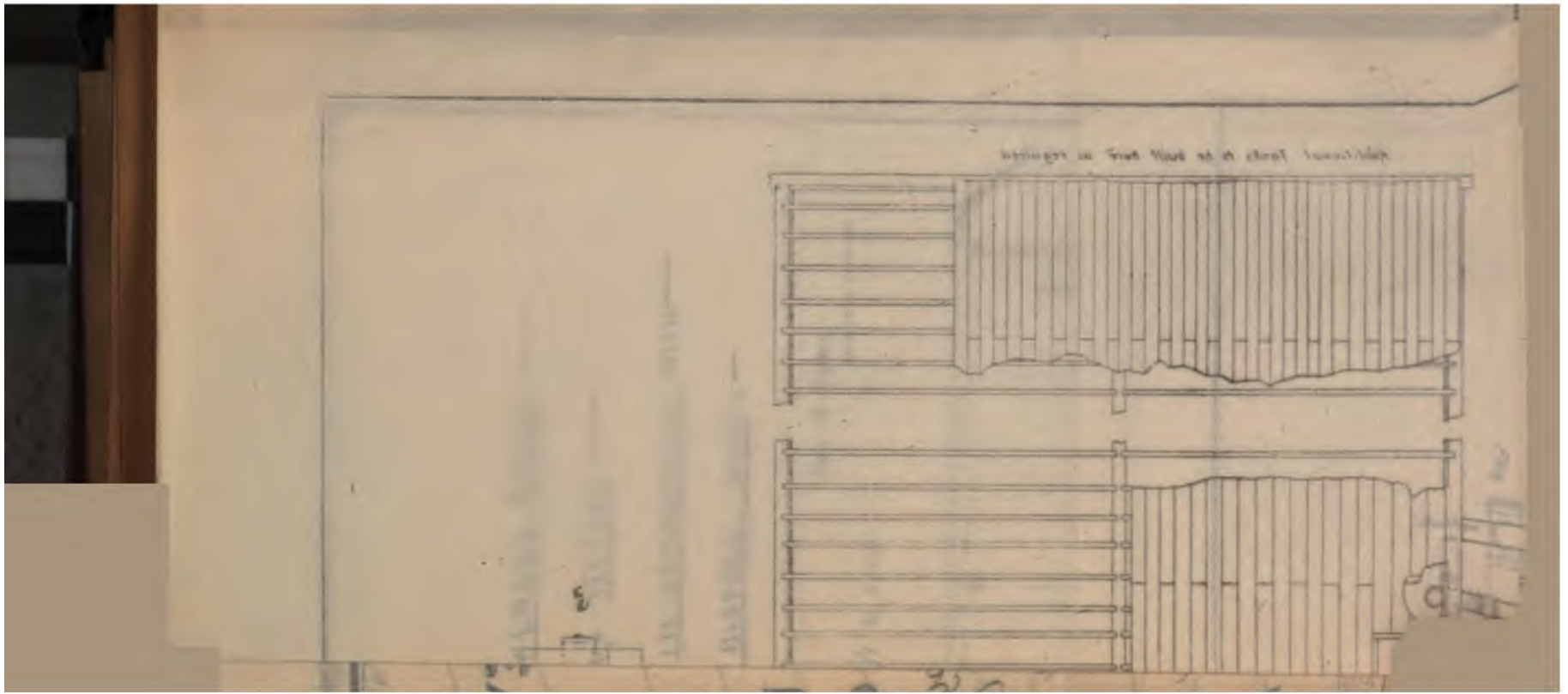
A glance at the map shows at once the direction and location, and the rationale of the design of these sewers, and it is sufficient to say here that the sewage from this portion is — with one exception — all brought to the corner of Bank and Ingersoll streets, from where it is to be taken under the canal near the Ingersoll street bridge.

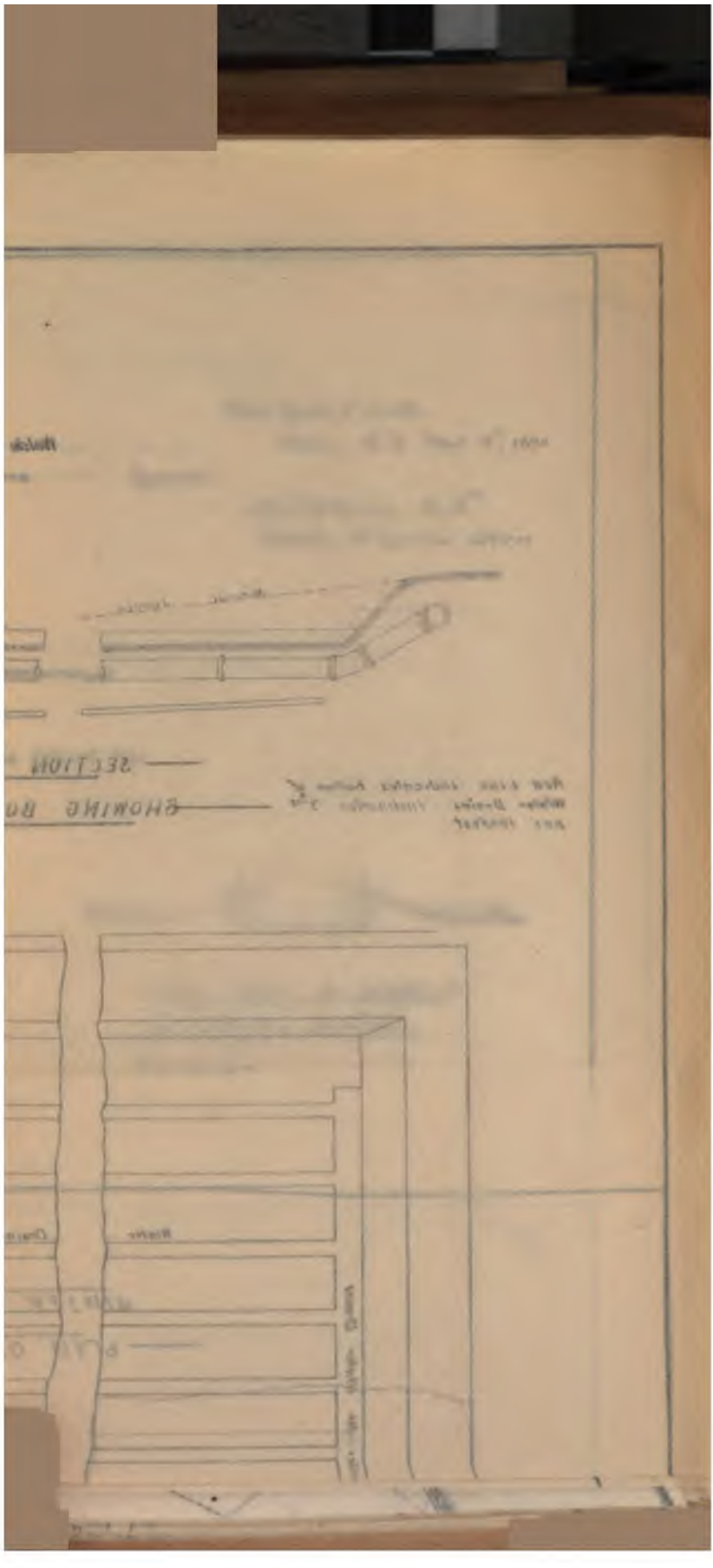
The exception mentioned is that part of State street east of Sandy creek. It is possible that it will be many years before the people of that part of the street call for a sewer; but when they do, the method of procedure outlined on the map, is not only the cheapest, all things considered, but the best, as will be shown in the discussion of outlets. The method of sewering this portion is clearly shown on the map, and needs no explanation here.

In designing the sizes of pipe for that portion south of the canal, the fact that the future growth of the village will undoubtedly be toward the south, has not been forgotten. Accordingly provision has been made, in size of pipe, for sewage of that portion of the town between Bailey street and the south corporation line.

ALBION
MAP
SEWERS
VILLAGE







SECTION OF FILTRATION FIELD.

Scale 10 ft to one inch.



3 in Tile Drains

The streets laid down on the map, and marked "Proposed streets" are the streets from which it is intended to take the sewage of this district.

The following table gives the grade, length, size and amount of sewage to be carried by each sewer.

In computing the amount of sewage, the streets were divided into three classes, according to the density of population and amount of water used.

They were as follows :

I. In which there are forty persons to each 100 feet of sewer, each using 140 gallons of water per day.

II. Thirty persons to each 100 feet of sewer, each using 100 gallons per day.

III. Fifteen persons to each 100 feet of sewer, each using eighty gallons of water per day.

In each of the above cases it was assumed that one-half the total amount of water used in twenty-four hours would be discharged into the sewer in eight hours, and the sewers are designed to run one-half full, when carrying this amount.

TABLE GIVING DIMENSIONS, LENGTH AND AMOUNT OF SEWAGE TO BE CARRIED BY EACH SEWER.

[... cubic feet per minute. D= diameter in inches. Grade is in feet per hundred.]

STREET.	From and to	Dist.	Grade.	Class.	Comp. Q.	Trib. Q.	Total. Q.	D.
[illegible]	West of Clarendon	1,100	.55	3	1.84	*4.00	5.84	6
[illegible]	Bailey-Railroad	300	.66	3		*4.00		6
[illegible]	Bailey-Railroad	265	2.30	3				6
[illegible]	Bailey-Railroad	180	5.50	3				6
[illegible]	Bailey-Railroad	260	1.15	3				6
[illegible]	Railroad-Madison	350	4.28	3				6
[illegible]	Railroad-Madison	250	2.00	3				6
[illegible]	Madison-State	40	1.00	3	3.82	9.84	13.66	6
[illegible]	Clarendon-McClatchy	2[illegible]	2.22	3	.45	13.66	14.11	8
[illegible]	Clarendon-McClatchy	[illegible]	.50	3	.49	14.11	14.60	8
[illegible]	West Academy-Clifton	500	.60	3	.83	.00	.83	6
[illegible]	[illegible]-Main	250	1.60	3	.41	.00	.41	6
[illegible]	Clifton-Main	750	.52	3	1.24	1.24	2.48	6
[illegible]	Alley-Bailey	1,105	1.03	2	5.86	2.48	8.34	6
[illegible]	Alley-Bailey	500	2.56	2	2.09	8.34	10.43	6
[illegible]	Alley-Bailey	525	1.92	2	2.19	10.43	12.62	6
[illegible]	Pine-Main	300	.50	2	1.49	.00	1.49	6
[illegible]	Pine-Chamberlain	167	.90	2	.67	14.11	14.78	6
[illegible]	Pine-Chamberlain	400	2.69	2	2.98	14.78	17.66	6
[illegible]	Railroad-[illegible]	400	1.00	3	.67	.00	.67	6
[illegible]	[illegible]-Main	350	.61			.00	.67	6
[illegible]	Pine-Brewer	200	2.00	2	.83	.00	.83	6
[illegible]	[illegible]-Main	500	1.80	3	.83	.00	.83	6
[illegible]	[illegible]-Chamberlain	395	.50	2	1.66	1.66	3.32	6
[illegible]	Main-Pine	405	.74	2	.68	21.65	22.33	6
[illegible]	[illegible]-Pine	300	1.00	3	.50	.00	.50	6
[illegible]	[illegible]-Chamberlain	200	2.00	3	.33	.00	.33	6
[illegible]	[illegible]-Chamberlain	530	4.40	3	.88	.33	1.21	6
[illegible]	[illegible]-Pine	360	1.39	3	.60	24.04	24.64	8
[illegible]	[illegible]	220	3.63	3	.36	.00	.36	6
[illegible]	[illegible]-Temperance	420	.71				25.00	8
[illegible]	McKinley-Temperance	1,100	1.10	3	1.84	.00	1.84	6
[illegible]	Lake-Temperance	380	.68	2	1.59	.00	1.59	6
[illegible]	Bailey-Railroad	650	1.69	3	1.08	7.43	8.51	8
[illegible]	Railroad-Chamberlain	210	3.80	3	.35	8.51	8.86	6
[illegible]	Harriet-Temperance	350	1.71	3	.58	.00	.58	6
[illegible]	Chamberlain	535	3.28	3	56	9.44	10.00	8
[illegible]	Main-Pine	345	1.45	3	.58	55.00	55.58	8
[illegible]	Pine-Temperance	270	1.85	3	45	.00	.45	6
[illegible]	Pine-Temperance	365	5.24	3	70	.45	1.15	6
[illegible]	[illegible]	115	.87	3	.19	1.15	1.34	6

Madison	Temperance-Reynolds	825	.42	3	1.37	36.92	38.29	10
Chamberlain	Herrick-Reynolds	400	1.50	3	.67	.00	.67	6
Chamberlain	McKinstry-Reynolds	230	.65	3	.38	.00	.38	6
Reynolds	Chamberlain-Madison	670	2.91	3	1.12	1.05	2.17	6
Madison	Reynolds-McKinstry	365	.42	3	.61	40.46	41.07	6
Bailey	East of McKinstry	650	.52	3	1.03	.00	1.08	6
McKinstry	Bailey-Madison	1,545	3.10	3	2.67	5.08	7.65	*6
Madison	Clarendon-McKinstry	720	.55	3	1.20	.00	1.20	6
McKinstry	Madison-State	385	.90	3	.64	59.92	60.56	10
State	McKinstry	80	.60	2	.32	75.16	75.48	12
State	Ingersoll	930	.64	2	3.88		3.88	6
East Bank	State	220	.90	3	.37	79.36	79.73	12
East Bank	Ingersoll	1,070	.40	3	1.79	79.73	81.52	12
Bailey	Corporation line-King	200	.50	3	.33		.33	6
Bailey	Corporation line-King	875	.40	3	1.46	4.33	5.79	*6
Bailey	Hamilton-King	630	.71	3	1.05		1.05	6
King	Bailey-Railroad	450	.51	3	.75	10.84	11.59	*6
King	Railroad-Washington	305	4.91	3	.51	11.59	12.10	6
Washington	Corporation line-King	1,070	.40	3	1.78		1.78	6
West Academy	Allen-Bailey	310	2.58	3	.52		.52	6
West Academy	Allen-Bailey	2,030	2.58	3	3.39	.52	3.91	6
Bailey	Clinton-West Academy	500	1.68	3	.83		.83	6
West Academy	Railroad-Bailey	350	.50	3	.58		.58	6
Bailey	West Academy-Hamilton	715	.50	3	1.19	5.32	6.51	6
Allen	West of Hamilton	670	.75	3	1.12		1.12	8
Allen	West Academy-Hamilton	550	.55	3	.92		.92	6
Hamilton	Allen-Bailey	700	2.00	3	1.17	2.04	3.21	6
Hamilton	Allen-Bailey	1,725	2.60	3	2.88	3.21	6.09	6
Hamilton	Bailey-Washington	750	.53	3	1.25	12.60	13.85	6
Washington	West Academy-Hamilton	600	1.33	3	1.00		1.00	6
Washington	Hamilton-King	730	1.82	3	1.22	14.85	16.07	6
King	Washington-Park	785	.85	3	1.31	29.95	31.26	8
Day	Washington-Park	650	2.57	3	1.05		1.05	6
Park	West Academy-Day	280	.97	3	.47		.47	6
Park	Day-King	1,060	.50	3	1.77	1.72	3.29	6
King	Park-State	385	.36	3	.64	34.55	35.19	10
State	West of King	560	.60	3	.93	.93	.93	6
State	King-West Academy	310	.30	3	.52	36.12	36.64	10
State	West Academy-West	1,020	.72	2	4.26	.60	4.26	6
West	State-Bank	440	.30	2	1.84	40.90	42.74	10
Bank	West-West Academy	850	3.00	2	3.55	42.74	46.29	12
Bank	West-West Academy	345	.30	2	1.44	46.29	47.73	12
Clinton	Allen-Bailey	615	3.73	3	1.02	.00	1.02	6
Clinton	Allen-Bailey	1,450	1.93	3	2.42	1.02	3.44	6
Bailey	Main-Clinton	600	1.16	2	2.51	.00	2.51	6
Clinton	Bailey-Washington	340	2.06	3	.57	5.95	6.52	6
Clinton	Bailey-Washington	400	.50	3	.67	6.52	7.19	6
Clinton	Beaver-Washington	400	.50	3	.67	.00	.67	6
Washington	Clinton-West Academy	625	.8	3	1.04	7.86	8.90	6
West Academy	Washington-Park	790	2.12	3	1.32	8.90	10.22	6

TABLE GIVING DIMENSIONS, LENGTH AND AMOUNT OF SEWAGE, ETC.—(*Concluded*).

STREET.	From and to	Dist.	Grade.	Class.	Comp. Q.	Trib. Q.	Total. Q.	D.
Park	Main-Clinton	680	1.89	2	2.42	.00	2.42	6
Beaver	——— Clinton	160	2.66	3	.26	.00	.25	6
Clinton	Beaver-Park	280	3.21	3	.47	.25	.72	6
Park	Clinton-West Academy	630	2.06	2	2.63	3.14	5.77	6
West Academy	Park-State	390	1.03	3	.65	15.99	16.64	8
State	Clinton-West Academy	500	1.00	2	2.09	.00	2.09	6
West Academy	State-Bank	630	.79	3	1.05	18.73	19.78	8
Bank	West Academy-East Academy	230	.20	3	.38	67.51	67.89	12
East Academy	State-Bank	480	1.66	3	.80	.00	.80	6
Bank	East Academy-Clinton	395	.20	2	1.64	68.69	70.33	12
Clinton	Park-State	270	4.44	2	1.11	.00	1.11	6
State	Liberty-Clinton	280	2.14	2	1.15	.00	1.15	6
Clinton	State-Bank	630	1.27	2	2.63	2.26	4.89	6
Clinton	Canal-Bank	300	.66	2	1.25	.00	1.25	6
Bank	Clinton-Liberty	365	.20	2	1.51	76.47	77.98	15
State	Main-Liberty	200	1.00	2	.83	.00	.83	6
Liberty	Park-State	280	3.23	3	.46	.00	.46	6
Liberty	State-Bank	150	5.73	3	.26	1.29	1.54	6
Liberty	State-Bank	460	2.69	3	.77	1.54	2.31	6
Liberty	Canal-Bank	300	.66	2	1.25	.00	1.25	6
Bank	Liberty-Main	355	.20	1	2.77	81.54	84.31	15
Main	Park-State	270	2.95	2	1.11	.00	1.11	6
Main	State-Bank	590	4.06	1	4.69	1.11	5.71	6
Main	Canal-Bank	300	.66	1	2.34	.00	2.34	6
Bank	Main-Platt	415	.20	1	3.23	92.36	95.59	15
Platt	State-Bank	470	5.10	1	3.67	.00	3.67	6
Platt	Canal-Bank	200	.50	1	1.56	.00	1.56	6
Bank	Platt-Ingersoll	490	.20	2	3.82	100.82	104.64	15
State	Main-Ingersoll	600	2.66	2	2.51	.00	2.51	6
Ingersoll	State-Bank	520	.96	3	.86	2.51	3.37	6
Ingersoll	State-Bank	70	.50				3.37	6
Ingersoll	Bank-Canal	180	.20	3	.30	189.53	189.83	18
Ingersoll	Canal crossing	120	.40			189.83	189.83	118
Ingersoll	Canal-Caroline	350	.14	3	.57	189.83	190.40	18
North avenue	——— Caroline	200	.50	2	.84	.00	.84	6
North avenue	Canal-Caroline	200	1.25	1	1.56	.00	1.56	6
Caroline	Main-Ingersoll	900	.50	2	3.76	2.40	6.16	6
Ingersoll	North of Caroline	750	.40	3	1.25	.00	1.25	6
Caroline	Ingersoll-Brown	3,290	.21	3	8.48	127.81	203.89	18
Brown	Caroline ———	980	.15	3	1.63	209.20	210.93	118
Outlet sewer	Brown-Field	3,500	.13				210.93	18

* Four cubic feet from proposed street. † Cast-iron pipe. ‡ Six cubic feet from East State street.

ESTIMATE.

The following estimate has been prepared with a great deal of care, and it is believed to approximate very closely to the actual cost.

The estimate of the amount of rock to be excavated is based on borings and soundings made by Mr. Waldo.

Sixty-eight thousand three hundred and sixty lineal feet excavation and back filling, including 10,000 cubic yards of rock		$32,327 52
Pipe furnished and laid :		
Fifty-two thousand four hundred and five lineal feet (6-inch) at 12 cents	$6,288 60	
Three thousand six hundred thirty lineal feet (8-inch) at 17 cents	617 10	
Two thousand seven hundred and ten lineal feet (10-inch) at 24 cents	650 40	
Three thousand one hundred and ninety lineal feet (12-inch) at 31 cents	988 90	
One thousand six hundred and twenty-five lineal feet (15-inch) at 45 cents	731 25	
Four thousand eight hundred lineal feet (18-inch) at 59 cents	2,832 00	
		12,108 25
Branches :		
One thousand eight hundred (6-inch) at 22 cents	$396 00	
One hundred and thirty (8-inch) at 34 cents	44 20	
One hundred (10-inch) at 49 cents	49 00	
One hundred and ten (12-inch) at 64 cents	70 40	
Sixty (15-inch) at 94 cents	56 40	
One hundred and fifty (18-inch) at $1.27	190 50	
		806 50
Man-holes :		
Seven man-holes at $60	$420 00	
Ten man-holes at $50	500 00	
Fifty-five man-holes at $40	2,200 00	
		3,120 00

Flush-tanks :		
Fifty-four flush-tanks at $40		$2,160 00
Lamp-holes :		
Fifteen lamp-holes at $12		180 00
Canal crossing at Ingersoll street		1,000 00
Outlet sewer :		
Five hundred lineal feet excavation, eight feet deep, at 36 cents	$180 00	
One thousand lineal feet excavation, 14 feet deep, at 90 cents	900 00	
Five hundred lineal feet excavation, 15 feet deep, at 97 cents	485 00	
Five hundred lineal feet excavation, 7 feet deep, at 27 cents	135 00	
One thousand lineal feet, excavation 4 feet deep, at 12 cents	120 00	
Three thousand five hundred lineal feet, 18-inch pipe at 59 cents	2,065 00	
Five man-holes at $40	200 00	
		4,085 00
East State street sewer :		
Three thousand seven hundred and ninety lineal feet six-inch sewer laid	$3,790 00	
Five man-holes, at $40	200 00	
One flush-tank, at $40	40 00	
		4,030 00
East State street outlet :		
Nine hundred and forty lineal feet (6-inch) sewer laid, at 30 cents	$282 00	
One hundred and fifty lineal feet (6-inch) cast-iron pipe under canal	67 50	
Laying same and extras	50 00	
One thousand seven hundred lineal feet cast-iron pipe	785 00	
Laying same	204 00	
One thousand seven hundred lineal feet trenching at 20 cents	340 00	
Creek crossing, extra	100 00	
Race crossing, extra	100 00	
		1,928 50

North avenue and New street sewers:		
One thousand six hundred feet (6-inch) sewer laid, at 30 cents	$480 00	
Two flush-tanks at $40	80 00	
One man-hole	40 00	
		$600 00
North avenue outlet sewer:		
Three thousand four hundred feet (6-inch) cast-iron pipe, at 25 cents per foot	$1,125 00	
Laying same	400 00	
Trenching	1,755 00	
Flushing appliance	50 00	
		3,330 00
Right of way for outlet sewers		1,200 00
Filter field:		
Twelve acres of land, at $100	$1,200 00	
Leveling seven acres and building embankments, at $200	1,400 00	
Draining seven acres, at $170	1,190 00	
One foot of sand on seven acres at $400	2,800 00	
Winter drains for seven acres at $270	1,890 00	
Settling tanks and all appliances	2,000 00	
Store-shed for winter drains	500 00	
Barn and storehouse	600 00	
Team and tools	600 00	
		12,180 00
Contingent expenses on whole system		10,940 23
System complete		$90,000 00

While we have made a large number of borings and soundings to determine the location of the rock, there is still a considerable uncertainty about it, hence we have added the large item for contingent expenses.

APPENDAGES.

FLUSH-TANKS.

There are so many different flush-tanks on the market, differing so little in efficiency or price, that we have not thought it desirable to call for any particular kind, leaving that to be decided by the commissioners.

We do, however, stipulate that they shall have a capacity of, at least, 150 gallons, and be discharged twice in twenty-four hours,

of only .4 grade.

The extra provision for flushing wil good running order.

Man-holes.

The drawing of a man-hole shown on] design of those appendages. The parti for those points where the main sewer i necessary to bring the laterals to that shown, the man-hole is kept clean, and t easily inspected.

Lamp-holes.

The method of constructing lamp-hol Plate I, and needs no further description

Outlet.

Before locating the outlet sewer, it was question of disposal.

The regulations of the State Board of H it necessary, in designing a system of se some method of purifying the crude sewag any natural water course. We have ma exhaustive study of the various methods applicable to the conditions existing a entering into any discussion as to the me

Second. Was on the opposite side of the road, on land owned by Bailey.

Third. Was north of the village, on the south side of a road running east from Five Corners, as shown on the subplan.

After completing the surveys of the first two fields, it was found that they were undesirable for two reasons :

First. They were so high, that to get the sewage on to them necessitated, not only a very low gradient for the outfall sewer, but an unhandy appliance for removing the solid matter.

Second. When the fields were completed, the under-drains would be considerably below the high-water level of the creek.

These reasons were thought weighty enough to make the fields in question undesirable.

Our attention was then directed to the third or north field, which, after a careful examination of the surrounding country, was decided upon as the only desirable field available.

There are two ways of reaching this field with the outlet sewer from the canal crossing at Ingersoll street.

The first is to go north from the end of Ingersoll street, bearing a little east to avoid the hill.

The second is to go east on Caroline street to Brown street, north on Brown street to within about 200 feet of the corporation line, and then in a direct line northwesterly to the field.

By the first line it was found that the greater portion of Caroline street, all of Brown street, and that portion of State street before mentioned as the street unsewered in the network south of the canal, would be left without an outlet sewer, and further an outlet could not be constructed so as to bring their sewage to the north field. The amount of sewage from these streets would be too great to be turned into the creek; hence they would require separate disposal works. It is possible, though, to construct a filter-field on the south bank of Sandy creek, just at the east side of the corporation, which would dispose of the sewage of these streets.

Now, by the second line, the outlet sewer would take the sewage of these streets, but a portion of North avenue and New street would be left without an outlet. An outlet can be constructed, however, that will take their sewage to the north field.

In order to still further compare the two lines, careful estimates were made of the cost of each, and it was found that by the first

line the cost of the entire system would be about $5,000 less than by the second line. The interest on this $5,000, at four per cent, is $200, which would *not* pay the annual cost of maintaining the second filter-field, to say nothing of the inconvenience of having two outlets. For this reason, then, the second line was decided upon as the most feasible.

The sewage of North avenue and New street is to be disposed of in the manner indicated on the subplan, and to insure efficient flushing of that long line of iron pipe, it is to be connected with the water-works main by a by-pass and gates, so that the full force of the mains may be turned into it, if necessary. Also a grate is to be placed in the man-hole at the corner of North avenue and New street, which will screen out anything that would be liable to clog this cast-iron outlet pipe.

SPECIFICATIONS.

As to specifications, we will simply say that the sewers are to be constructed of the best quality of vitrified sewer-pipe, to be laid with cement and to careful grade and alignment.

FILTER-FIELD.

As stated in the body of our report the method of sewage disposal will be that of sand filtration.

In view of the rapid growth of the village, it is thought best to construct a field with an area of seven acres at the time of constructing the outlet sewer. The method of constructing the field is shown on Plate III. In this case, as the natural soil of the field is itself a fairly good filtering material, it is necessary to place on it only one foot of sand, which is to be clean, coarse building sand, the best to be obtained in the vicinity.

Two settling tanks are to be provided, which will take out the coarser part of the sewage before it goes to the field. These tanks are to be each 6x32x90 feet. Plan and section of them is shown on Plate II.

The under-drains which are to be of three-inch agricultural tile, are to be placed twenty feet apart and five feet below the surface of the field before the sand is placed upon it. They run in parallel lines from south to north and empty into one main effluent pipe, which in turn empties into Marsh creek, as shown on the subplan.

The method of operating the field during the warm months is as follows: The field will be divided into four parts, each of which is to receive all the sewage continuously for twelve hours and then be allowed to rest thirty-six hours. In the winter the field, or the greater part of it, is to be covered with a series of winter drains, the method of placing and constructing of which is shown on Plate III. During the colder months the sewage is to be allowed to flow into them continuously, while during warm periods of the winter they are to be relieved somewhat by allowing part of the sewage to flow on that part of the field which is not covered by the winter drains.

There are two ways of disposing of the "sludge" which collects in the settling tanks. One, and the one we recommend, is to run the sludge through the sludge pipes from the tanks into trenches ploughed on the field and then covered with the earth ploughed from the trench. The second, is to deodorize the sludge with ashes collected from the town, and an attempt made to sell the compound thus obtained for a fertilizer.

The yearly cost of operating the field may be estimated as follows:

Keeping team	$300 00
One man, salary	600 00
One man, salary	400 00
Repair, etc	100 00
Total	$1,400 00

In concluding this report, we wish to express our thanks to the members of the Board for their assistance while prosecuting our work, and also for their kindness in extending the time originally allotted for its completion.

We also wish to say that letters of patent are held by certain parties on what is called the "separate system" of sewerage, but the validity of the patent has not yet been established, and further, we do not believe it can be; hence we do not hesitate to recommend the system to any village that is in need of such sewerage as can be furnished by that method.

Respectfully submitted.

(Signed,) WALDO & DODGSON,
Engineers.

(Signed,) GEO. W. RAFTER,
Consulting Engineer.

Plans for the Sewerage of Gouverneur.

GENERAL SPECIFICATIONS FOR MATERIALS.

[NOTE.—All material must be delivered on cars at Gouverneur, N. Y., and be subject to inspection before unloading, and will be rejected if not according to these specifications.]

SEWER PIPE AND BRANCHES.

Sewer pipe and branches shall be first quality salt-glazed vitrified pipe, American Sewer-Pipe Company's "standard Akron" or other equal make satisfactory to the commissioners. The pipe shall be straight and true, smooth inside, free from cracks or broken blisters, without fire cracks that the engineer shall consider injurious, or chipped more than one inch deep in spiggot or bell, and must ring perfectly clear with ample room between spiggot and bell for a good yarn gasket. The branches shall include both T and Y shape, two feet in length, and the same quality and make as the plain pipe. The same price shall be bid for both T and Y. The house branches will generally be four-inch.

MAN-HOLE AND FLUSH-TANK COVERS.

Man-hole and flush-tank covers shall be cast-iron, weighing not less than 350 pounds including frame. The cover shall be perforated with eight one-inch holes and shall be twenty-two inches in diameter and one and three-fourth inches thick. The frame shall be ten inches high and three feet four inches outside diameter, with eight-inch flanges.

VENTILATOR COVERS.

Ventilator covers shall be similar to the man-hole covers, and shall not weigh less than 175 pounds each, including frame. The cover shall be fourteen inches in diameter and the frame two feet eight inches outside diameter. Both the man-hole and ventilator covers shall be fitted with dirt pans, and all coated with asphalt or coal-pitch varnish.

DUPLICATE.

N

TAGE

CATCH BASINS.

Catch basins shall be the Clapp patent, with stench trap, the grating to be sufficient for a twelve-inch outlet pipe.

FLUSH-TANK SIPHONS.

Flush-tank siphons shall be the Van Vranken, Field, or other satisfactory to the commissioners.

Any material rejected by the engineer or inspector will not be received, unloaded or paid for at any price, and none of the material must be shipped except upon a written order signed by the engineer stating the exact amount required.

GENERAL SPECIFICATIONS FOR LABOR, INCLUDING MATERIAL NOT IN MATERIAL SCHEDULE.

DISPOSAL WORKS.

Disposal works shall be built as shown by plans. The price shall include the automatic lime feed and building which will be located on the sewer outfall near the tank building. The lime feed building shall have rubble masonry foundation. Studding frame with novelty siding outside, well painted, and matched sheathing inside, the roof double, covered with steel roofing. To have one door and two windows, with outside blinds, cement floor, lock, hinges, and all fastenings complete, the tank to be one and one-fourth inch white pine, well hooped and painted outside, the tank to be supported on timber foundation twelve inches above the floor. The tank to be fitted with automatic feed, as shown on drawing, and also with a good hand-pump for filling the tank connected with the river or sewers as the engineer directs. The disposal works shall also include the man-hole (except siphon) at the lime-house. The main building of the disposal works shall have rubble masonry walls and foundation, the walls to be two feet thick at top and three feet at bottom; well plastered with Portland cement-mortar inside, and the tanks to have Portland cement or concrete floor. The building shall have timber or studding frame. Trussed roof. The frame covered outside with novelty siding and inside with building paper and matched sheathing. The roof shall be covered with steel roofing, laid over roofing paper, and the roof and outside of building to have two coats of oil paint, of a color to be selected by the commissioners.

The drying oven and mixing bed shall be built as shown on plan. The top of the oven shall be made of plates of cast or wrought-iron, bolted or riveted together, and the smoke-pipe shall run the entire length of the building into a brick chimney that shall be continued above the roof. The perchloride of iron feed shall be similar to the lime feed. The screens shall be No. 8 iron wire one inch, and one-half inch mesh. The screen chamber partition shall be built of flagstone, with angle-iron bracing. All valves shall be fitted with hand wheels. Platforms four feet wide shall be built over the walls, as shown on plans, to facilitate access to all parts of the tanks. Detail drawings of the several parts of the disposal works will be furnished by the engineer as the work progresses, and must be conformed to by the contractor.

TRENCHING AND LAYING PIPE.

Trenching and laying pipe shall include unloading and distributing the pipe and branches, and tile; all excavation of the trench to the grade shown on the plans or required by the engineer, laying, yarning and cementing the pipe and branches, including mortar, and shall include a galvanized or painted iron cover, thinly cemented into the T or Y branches; paving, clearing up, and removing all rubbish and stones excavated from the street. The sewer must be laid in straight lines between man-holes and ventilators, and to grades as fixed from time to time by the engineer. The work shall be commenced at the upper or lower ends of the sewer, or portions thereof, and laid up or down grade as the engineer may deem necessary to protect the sewer from injury during construction. The sewer cannot be used for draining the trenches, all water in the trenches must be removed by pumping or bailing. No pipe shall be laid in water, except as herein specified. To connect the pipe and branches an oakum or jute gasket shall be packed in the bell, and then the joint all around carefully filled with cement mortar by workmen using rubber mittens. The mortar shall be composed of one part fresh Rosendale cement and one part sharp sand, except in wet places, where it shall be composed of Portland cement, mixed and used as the engineer directs, or if quicksand or water is encountered Standford's patent joint or composition filling must be used. The sewer must be made water tight. T and Y branches for house connections shall be set at such points as the commis-

sioners or engineer directs, and shall be marked by a stake reaching from the bottom to the top of the trench. When deemed necessary by the engineer a foundation of timber, gravel, stone or concrete shall be constructed in the bottom of the trench to support the pipe. The width of the trench at the bottom must be at least one foot greater than the diameter of the pipe. The pipe must have a full length bearing on the bottom of the trench, bell-holes being made at the joints. The earth must be carefully tamped under and around the pipe half way up the sides, then carefully filled to two feet above the pipe with selected material. The trench may then be filled and tamped or settled with water as the engineer directs, after the cement shall have well set. No large stones shall be used in filling the trench. When necessary to prevent caving, the trench shall be braced at the expense of the contractor. Openings in the pipe must be covered at night, and closed with a plug and clay or mortar if there is danger of water entering the pipes during storms.

DRAIN TILE.

Drain tile shall be good well burned ordinary sound agricultural tile. They shall be laid on a board a little below and on one or both sides of the sewer pipe and at such places as the engineer directs. The joints of the drain tile shall be temporarily protected from access of earth and sand by paper, jute or other suitable material. The tile covering shall be selected from the most compact earth taken from the trench.

CAST-IRON PIPE.

Cast-iron pipe shall be twelve feet in length (exclusive of bell) and without cracks. It may be either bell or flange pipe, if bell it shall have ball joints on each length laid in water, and if flanges on every two lengths laid in the water. The pipe shall be coated inside and out with coal pitch varnish. The price per foot shall include the ball joints. This pipe is to be laid in the river.

ROCK TRENCHING.

Rock trenching shall be solid rock, or that which cannot be removed with a downward stroke of a pick, and the price bid shall be in addition to the trenching and laying price for pipe, and per lineal foot for each foot in depth and in proportion for

fractions of a foot in depth, the trenches shall be made below grade as the engineer directs, and a bed for the pipe made by refilling with earth to grade. The expense of refilling must be included in rock price. Excess of rock after filling the ditches shall be removed by the contractor.

MAN-HOLES.

Man-holes shall be built of hard burned brick, wet, and laid in mortar consisting of one part Rosendale cement and two parts sharp sand. They shall have eight-inch walls and an iron cover, and shaped as shown on plans. The sewer invert shall be saddle or split pipe and the bottom of the man-hole shall be level with the top of the sewer, and shall be coated with cement. Covers shall be protected with cobble paving two feet wide around the same.

VENTILATORS.

Ventilators shall be pipe carried up from a T set in the sewer pipe to within six inches of the surface of the ground. The pipe shall be the same size as the sewer on which they are located, but not larger than ten-inch. They shall have an iron frame and cover supported by brick work, extending to the bottom of the trench, as shown on plans, and shall be protected by cobble paving in the same manner as man-holes.

STREET FLUSH-TANKS.

Street flush-tanks will be similar to man-holes and as shown on plan, the siphon or flushing apparatus will be furnished by the commissioners and will be set in place by the contractor. The contractor shall furnish the water pipe connections and fittings.

CATCH-BASINS.

Catch-basins shall be of brick, eight inches thick and as shown on plan. They shall have stench-trap, flagstone bottom. The street shall be paved for a distance of three feet around the mouth of the basin, and they shall be built according to plan.

RUBBLE MASONRY.

Rubble masonry includes all stonework about the outfall, and the foundations of the disposal works and buildings. It shall be of good sized, sound field or quarry stone with good beds, and

laid in cement-mortar, consisting of one part Rosendale cement and two parts sharp sand. The price for masonry shall include earth excavation necessary to lay the same.

CONCRETE.

Concrete shall be composed of Rosendale cement, sand and stone, mixed and used as the engineer directs, and no other way.

TIMBER IN FOUNDATIONS.

Timber in foundations shall include all timber and plank, including spikes used in the trenches and under the pipe or buildings, required to make a safe support for pipe and walls.

ESTIMATES.

The measurement for pipe laying shall be from center to center of man-holes and ventilators, or to the end of pipe laid and to the back of flush-tanks. A monthly estimate will be made for the material or work done at schedule prices, and eighty-five per cent paid the contractor on or before the tenth of each month for work done in the previous month.

COMPLETION.

The material in material schedule must be delivered on or before and all the work completed on or before.....

RESIDENTS.

The contractor shall employ residents of Gouverneur, N. Y., in preference to other workmen.

IN GENERAL.

The contractor must provide danger-lights and guards for trenches and holes left open at night, and shall be liable for all damages for which he or his workmen shall be blamable, whether from carelessness or ignorance. The work shall be carried on as rapidly as possible and so as to inconvenience the public the least, and shall be done to the full satisfaction of the board of sewer commissioners. If required by the commissioners, twenty dollars per day will be retained from any money due the contractor for each and every day the work shall not be completed as stated in these specifications.

Within fifteen days after acceptance of the work in writing by the board of sewer commissioners, the board will make a final

estimate, and the same will be paid the contractor within thirty days after acceptance of work. The contractor must keep the work in repair four months after completion of and acceptance, unless the necessary repairs were not caused by his or his workmen's acts. No connections must be made with any house-sewer except upon a written order signed by the clerk of the board of commissioners.

No extra work or material will be paid for unless the same shall have been ordered in writing by two of the commissioners. Any sheet piling ordered left in the work by the engineer, will be paid for at "timber-in-foundation" price. All the material furnished by the commissioners for the work will be charged to the contractor; he must bear all loss in delivery and placing in the work. No deviation shall be made from plans and specifications unless ordered by the engineer. The engineer shall interpret the meaning of the plans, and the board of sewer commissioners shall be judge of quality and quantity of material or labor.

Pipe must be laid only in open trenches, no tunneling will be done except when directed by the engineer. Blasts shall be protected and fired as the engineer directs. No extra depth in trenches will be paid for unless exceeding one foot more than those called for by the plans. The contractor shall be liable for all damages to gas and water-pipes, drains and sewers. Uninspected material unloaded by the contractor will be on his own responsibility and will be charged in full to him. Only cement approved by the board shall be used. Cement and sand must be mixed before wetting, and Portland cement-mortar worked as dry as possible. All mortar must be made in small lots and used before setting. When directed by the engineer the contractor shall increase his force, if he does not comply, the engineer will employ additional help and the same must be paid by the contractor. These specifications are condensed as much as possible. The details of carrying out the same will be included in the contract. A bond for the faithful performance of the contract will be annexed thereto.

APPROXIMATE ESTIMATED QUANTITIES.

MATERIAL SCHEDULE.

Eighteen thousand lineal feet six-inch vitrified sewer pipe.
Eighteen thousand lineal feet eight-inch vitrified sewer pipe.
Two thousand lineal feet nine-inch vitrified sewer pipe.

Seven thousand five hundred lineal feet ten-inch vitrified sewer pipe.

Four thousand lineal feet twelve-inch vitrified sewer pipe.

Three hundred lineal feet fifteen-inch vitrified sewer pipe.

Three hundred six-inch pipe T or Y branches.

Five hundred eight-inch pipe T or Y branches.

Fifty nine-inch pipe T or Y branches.

Three hundred ten-inch pipe T or Y branches.

Twenty twelve-inch pipe T or Y branches.

Sixty-six man-hole and flush-tank covers, complete.

Thirty-five ventilator covers, complete.

Four catch-basins, complete.

Nineteen six-inch flush-tank siphons.

One twelve-inch flush-tank siphon.

LABOR SCHEDULE.

Seventeen thousand five hundred lineal feet trenching and laying six-inch pipe.

Seventeen thousand five hundred lineal feet trenching and laying eight-inch pipe.

Two thousand lineal feet trenching and laying nine-inch pipe.

Seven thousand five hundred lineal feet trenching and laying ten-inch pipe.

Four thousand lineal feet trenching and laying twelve-inch pipe.

Three hundred lineal feet trenching and laying fifteen-inch pipe.

Three hundred lineal feet furnishing and laying sixteen-inch cast pipe.

Five thousand lineal feet furnishing and laying three-inch tile.

Four thousand lineal feet rock trenching one foot deep.

Forty-seven man-holes complete (except covers).

Thirty-five ventilators complete (except covers).

Nineteen flush-tanks complete (except siphons).

Four catch-basins complete.

Five thousand feet board measure timber in foundations.

Thirty lineal feet six-inch cast pipe (air pipe).

Two thousand and eighty pounds special castings (air pipe).

UNION COLLEGE, SCHOOL OF CIVIL ENGINEERING,
SCHENECTADY, N. Y., *May* 19, 1890.

LEWIS BALCH, M. D., *Secretary State Board of Health, Albany, N. Y.:*

SIR.—I have the following report to make of my investigation of the questions that arose concerning the disposal of sewage from the proposed new system at Gouverneur.

According to the plan as presented, the sewage was to be discharged through six outlets, three above the dam which is at the crossing of the Main street and three below that dam. The principal outlet is below the dam and the amount of sewage which would be discharged from the three outlets above the dam would be small for a number of years, until a considerable growth in population had occurred. The amount of water flowing in the Oswegatchie river at Gouverneur is in general quite large, as it is the drain for over 500 square miles of territory, and this flow is equalized by the action of a large reservoir which has been constructed on the upper river to store water for the use of the mills in summer. The dilution is without doubt large enough to prevent the formation of any nuisance in the dam unless, possibly, at some time in the future, when the population in the portions which it is proposed to drain into the river above the dam has largely increased, there might be generated some nuisance from the sedimentation of the sewage. This danger is slight, but it no doubt exists. At the present time the small system of water-works which the village possesses takes its supply from the dam. So long as this is true, there is no question that the sewage should be carried below the dam before being discharged into the river, whether it is purified before discharge or not. The water-works will, probably, be enlarged before long, and there is a proposition to remove them at the same time to a point up stream, quite above any source of pollution in the village. There is, however, another proposition to enlarge the works at their present site. At the time of my visit, last Saturday, there was a large flow of water, so that it was rather difficult to judge as to the flow at ordinary or low stages, but from the best information I could gather there are several months in the year when but little or no water flows over the dam and the reservoir must be drawn on to keep up the supply for the mills.

Of the outlets above the dam, that on Water street can readily be turned below the dam as that would necessitate only a few feet

of cutting of ten to fourteen feet depth along Water street and across Main street. The outlet from Hailesboro street would be more difficult to manage and could, probably, be best turned below by a pipe laid in the river and projecting through the dam. The outlet from Grove street is still more difficult to manage as a pipe in the river for 1,600 feet or a deep cut along South street for its whole length would be required, or an ejector near the creek has been suggested. Should purification of the sewage be required the treatment of these outlets must be still different, as outlined below.

To aid in a decision of the question of sewage purification I have the following statement of the facts bearing on the question that I was able to gather during last Saturday.

The total watershed of the Oswegatchie river is in extent about 1,200 square miles of which not quite half is above Gouverneur. The population on this upper portion is about 6,000 or about ten per square mile. There are no villages on the river above Gouverneur. On the portion of the watershed whose waters enter the Oswegatchie below Gouverneur the population is about 28,000 or about forty per square mile. Of this population there are less than 1,000 in two or three little railroad stations on the river. About 11,000 people, including Gouverneur, are in the towns and villages draining directly into the river below. About one-third of the watershed drains through Black lake into the Oswegatchie just above Ogdensburg. This portion of the watershed has a population of about 17,000, with several villages. The figures for population are taken from the census for 1880, and should probably be increased somewhat at this time, but of the twenty-seven towns lying wholly or partly in the watershed, nineteen increased in population between 1870 and 1880, and eight decreased.

The river is very circuitous in its wanderings below Gouverneur and flows about fifty miles to reach Ogdensburg. It falls in this distance about fifty-four feet over seven dams varying from seven to sixteen feet in height, and an additional amount in rapids and in its general fall which is estimated at about twenty feet. This estimate is verified by the railroad levels, if I am rightly informed.

I have no very definite statement of the minimum flow of water in the river. A gentleman connected with the water-power company of the river, estimates that the low-water flow at Ogdensburg

will scarcely run five wheels. If each wheel has a prescribed water power of twenty-five cubic feet a second, this would give about 125 cubic feet a second as the minimum flow. One-third of this enters from Black lake, and about half, or say sixty-five cubic feet a second passes Gouverneur. At Gouverneur the action of the storage reservoir has a beneficial effect upon the flow. At Ogdensburg this effect is not so marked owing to the detention of the water in pools in the river and the longer distance it has to travel.

There are numerous pools for sedimentation, the falls mentioned for aeration, and the dilution of sixty-five cubic feet a second of water for one-half to one cubic foot a second of sewage at Gouverneur, and an increase in the diluting water of about 100 per cent by the time Ogdensburg is reached. The portion of the diluting water which comes from Black lake is somewhat polluted by the drainage from the most thickly populated section of the water-shed, including several villages, which has some opportunity for purification during its slow flow, and in summer time detention in the lake and in numerous ponds and pools. All the water shows, in its brown color, a considerable degree of pollution from vegetable sources.

The flatness of the country in the lower parts of the water-shed is exemplified by the "natural canal" which joins the Oswegatchie and Grassy rivers, through which water flows in either direction, as one or the other stream is in flood, so that it is possible for a small amount of the sewage of the village of Canton to reach Ogdensburg.

The city of Ogdensburg takes its water supply from the Oswegatchie, above the last dam. A portion of the city lies above the intake, and drains directly into the river, but an attempt has been made to get out of the reach of this pollution by carrying the inlet pipe some distance up the stream and out into its center. The intake is still not above the houses spoken of, but may be out of reach of their drainage. Judging by our own experience in Schenectady it is often necessary to use water directly from the river near by, owing to the failure of the intake to furnish enough water, through stoppages or other causes. It is to be hoped that Ogdensburg is more fortunate. There has been some talk of changing the source of the water supply to the St. Lawrence, but this has not been done. The superintendent says that analyses have shown that the water of the Oswegatchie is more nearly pure and is a

more satisfactory water than that of the St. Lawrence. He has been unable as yet to furnish me with the numerical results of these analyses.

Should sewage purification be decided upon, all the sewer outlets but one can be changed and the sewage brought to the location of the disposal works shown on the plans. This collection of the sewage will require a deep cut along South street to take the Grove street sewage or an ejector placed near the creek crossing on Grove street, as before described; the cut through Water street across Main street, already described; an inverted siphon under the river for the Hailesboro street outlet; a rather deep cut in Main street, and a bridge crossing for the Johnstown street outlet. All of Pea street cannot well be brought into the disposal works without pumping, as its slope is from Main street towards the river. About three or four hundred feet of it only will be in this condition. The amount of sewage to be discharged from this length of sewer is so small that its discharge directly into the river need not be feared.

Respectfully submitted.

CHAS. C. BROWN, C. E.

Report on the Sewerage of Medina.

SPECIFICATIONS FOR SEWERS, MEDINA, N. Y.

Excavation.

The sewers will be excavated in open trenches to the depths shown on the profiles. The grade line on profiles is bottom of inside of pipe. In rock they will be six inches deeper and filled with sand or fine loam.

Pipe.

Pipe will be first quality salt-glazed sewer pipe, perfect in every respect.

Laying.

It will be laid truly to the lines and grades given by the engineer, and the joints will be made with gasket and cement. Lateral sewers will join mains by curves of at least twenty feet radius. Y branches will be put in opposite every lot, usually two about each sixty feet.

Filling.

Filling of sand or fine loam will be carefully tamped about the pipe and for one foot above it.

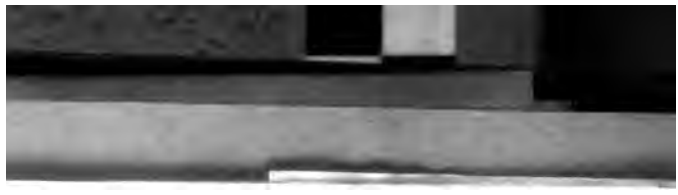
Lamp-holes.

Lamp-holes will be formed by turning up a six-inch "T," and carried up to the street line by a six-inch pipe covered by cast-iron perforated cover with dust pan. Lamp-holes also serve as ventilators.

Man-holes.

Man-holes will be ordinary three-feet diameter with eight-inch brick walls plastered with cement-mortar inside and out. Bottom to be carefully formed to shape of invert of sewer. In soft material, bottom must be of concrete and to have cast-iron perforated covers with dust pans.





FLUSH-TANKS.

Flush-tanks will be "Field's" or "Van Vranken's" or other tank equally acceptable to the board of sewer commissioners. The walls will be of brick, eight inches thick, plastered with cement mortar inside and out. They must extend from bottom of sewer to grade of street, and in soft material will have concrete bottom. They will have cast-iron perforated covers with dust pans. They will have one-inch iron pipe extending one foot outside and furnished with brass stopcock, to be connected with water-works when they are put in.

CATCH-BASINS.

Catch-basins will be three feet in diameter and eight feet deep. At half their depth they will be connected with the sewers by six-inch pipe with running trap. They will be covered with cast-iron bar grates.

It is expected that the sewer from the Erie canal, at the foot of West street, to the Oak Orchard creek will be built by the State, $10,000 having been appropriated by the Legislature for that purpose.

For this reason, I have made no specifications respecting it, since it will be entirely under the control of the State authorities.

DETAILED STATEMENT TO ACCOMPANY SEWER MAP OF THE VILLAGE OF MEDINA, N. Y.

The board of sewer commissioners of the village of Medina, N. Y., were appointed by the trustees of said village, August 16, 1889, pursuant to the provisions of chapter 375 of the Session Laws of 1889, and consists of the following named persons: Graham H. Hill, Roswell W. Post, William U. Lee, Morton A. Bowen and Albert L. Swett.

On the 28th day of August, 1889, the said board of sewer commissioners was duly organized by electing Albert L. Swett, president of the board. On the 13th day of September, 1889, Edward Posson was elected clerk of the board.

At subsequent meetings of said board of sewer commissioners lines of sewers were located, making a complete system of sewerage for said village.

A sewer map of said village was prepared in accordance therewith by O. C. Gillette, civil engineer and surveyor. Said map and

tracing and specifications are herewith transmitted together with a detailed statement, as required by section 3 of chapter 375 of the Laws of 1889.

To the State Board of Health:

The undersigned, sewer commissioners of the village of Medina, submit the following detailed statement to accompany the sewer map of said village.

The corporation limits cover four square miles, of which fully two-thirds, if not three-fourths, is farming lands and used and worked as such.

The population in 1850 was	3,600
The population in 1860 was	4,000
The population in 1870 was	4,200
The population in 1880 was	4,600
The population in 1890 will be	4,800

In the same proportion of increase, the population fifty years hence will be 6,300.

The general slope of the land is towards the north, and the land slopes away from the occupied part, or built-up part, of said village, on the west, north and east; and all the south part is easily drained eastward to the Oak Orchard creek, so that the drainage required is that only of the part of said village built upon.

And the sewers emptying into Oak Orchard creek above dams, are used simply for cellar drainage, as the people in that part of the village have privy vaults. And that the sewage as proposed on accompanying map cannot become offensive for the reason that water closets will not be connected therewith, and kitchen slops are thrown out of the back door.

Further, that cellar drainage only will be required of the sewers emptying into Oak Orchard creek above the dams on said stream, and the nearest dam beyond the outlet of main sewer on West street sewer, is sixteen miles distant on a rapid running stream.

REPORT ON THE SEWERAGE OF MEDINA, N. Y.

Herewith I transmit plans for the sewerage of this village.

I have made no provision for sewerage north of the Erie canal for the reason that our sandstone quarries are located in this

part of the village, and the rock comes close to the surface, and the poorer class of our population lives here. The village at large will never build sewers in this part of the town owing to the great expense, and the inhabitants of this part are not able to do it, so that to make sewers in the north part of the town a part of our plan, would inevitably result in the rejection of the entire system.

A gauging of Oak Orchard creek in December, 1889, shows a flow of 300,000,000 of gallons per twenty-four hours, there being a depth of twelve inches on a sharp-crested weir 150 feet long which, according to J. B. Francis' formula, gives the above amount.

Statistics show that the water consumption of towns of 5,000 is less than fifty gallons *per capita per diem.* This is taken as a measure of the sewage. Suppose the whole population to use the sewers. This gives less than 250,000 gallons *per diem.* J. T. Fanning states that the minimum summer flow of streams is twenty-five per cent of their December flow. The waste-weir of the Erie canal at this place increases this summer flow, so that we have in the most extreme case supposable a dilution of over 300. The most often quoted authority names a dilution of twenty as all that is necessary, and a dilution of 300 is the most extreme that I have ever seen made.

The fall of Oak Orchard creek between this place and Lake Ontario is over 300 feet. No water supply is drawn from the creek or ever will be. The surface drainage is readily taken away on the surface, so that the system I have designed is principally the separate system; but I have made the pipes large enough to accommodate cistern overflow.

As nearly as I am able to find out, the present sewers are as follows:

The West street sewer is built of dry rubble stone side walls with flagging for covers (this is true of all our present sewers). It has no man-holes, lamp-holes, ventilators, flush-tanks or catch-basins; which is also true of all our present sewers. It is two feet wide and three feet high from the canal to North avenue. From there to its end, at Oak Orchard street, it is about two feet square. It is five feet deep at Oak Orchard street, seven feet at Park avenue, and runs seven or eight feet deep the rest of the way to the canal. At the street corners north of the railroad there are plain grates connected to the sewer by dry stone culverts. This

is also true of Prospect street sewer, which is a similar sewer only about two feet square.

It is about five feet deep at its upper end, eight feet deep at Center street, four feet at Commercial street, and empties into West street sewer.

South avenue sewer is two feet square. Its covers are at the surface of the ground at the upper end. It is eight feet deep at Gwinn street, four or five feet deep at West street, and runs about this depth the rest of its length. It has no appendages, not even grates.

The Elm street sewer is about eighteen inches square, also of dry stone. It is four or five feet deep and has no appendages.

The Fairman alley sewer is of dry stone, about eighteen inches square. It is pretty well filled up and largely useless. It is about six feet deep.

There is a small sewer in Race alley which drains a half dozen store cellars and empties into the Erie canal.

The surface water going to West and Prospect streets now discharges into the present sewer. I deem it more economical to continue this arrangement than to carry the water in surface gutters, and so have designed West and Prospect street sewers on the combined systems.

It is not likely that there will be fifty water-closets in this village within the next ten years, and it is highly probable that there never will be 100. These will all be situated within a circle of 600 feet radius, whose center is the intersection of West and Center streets.

For this part of the town I have specified automatic flush-tanks, since the pipes of the water-works which are expected to be put in here this season will probably be convenient for this, although it is not yet known where these pipes will be located. The other sewers will have to be flushed by movable tanks, and I deem this better, as it takes away a false sense of security and insures regular attention.

I have said nothing about the outlet sewer from the canal to the creek, since the Legislature has made an appropriation for the rebuilding of this, and it will be entirely under State control. I have made no provision for purification works, since the more I study the case the more firmly I am convinced that they are unnecessary and will be for a long time to come.

I have been a resident of this village for many years, and am thoroughly familiar with the habits and necessities of our population, and know better than any stranger possibly can, what will meet their requirements in the way of sewerage.

All of which is respectfully submitted,

O. C. GILLETTE.

By resolution of said board, the clerk was directed to forward the above, with the map, etc., to the State Board of Health for their approval.

EDWARD POSSON,
Secretary.

Dated, MEDINA, N. Y., *March* 26, 1890.

UNION COLLEGE, SCHOOL OF CIVIL ENGINEERING,
SCHENECTADY, N. Y., *April* 7, 1890.

LEWIS BALCH, M. D., *Secretary State Board of Health, Albany, N.Y.:*

SIR.— I have the following report to make of my examination of the plans for the sewerage and drainage of the village of Medina, Orleans county.

The objects to be gained by the system are the drainage of cellars in the greater portion of the village and the sewerage of the more thickly settled business and residence portions.

The solid rock is very near the surface under nearly all the village, and a number of drains of stone laid dry, have been put in to relieve the general wet condition of the foundations of buildings. There have thus far been no water-closets connected with these drains, as there has been no system of public water supply. Some slop drains from kitchens are connected with them. The proposed construction of a system of water supply, the unsatisfactory working of some of these drains and the necessity of additions thereto, have induced the sewer commissioners to prepare the present plans, to provide a system of sewers as well as drains. The system is designed to carry: First, cellar drainage; second, sewage and third, in the case of West and Prospect streets, surface water. This was deemed advisable over a limited area from local reasons.

The principles upon which the system is laid out are briefly stated in the accompanying report of the village engineer.

Were the streets paved and the blocks built up solidly or with paved areas, I think the size of the outlet pipe from West street would be found to be too small. But neither of these conditions now exists and is not likely to and the pipe will not be too small for many years, if ever. It is evidently the intention to lay the sewers in straight lines between openings, an excellent requirement. I have made some suggestions to the engineer regarding slight changes in the distribution of man-holes and lamp-holes, in the interest of economy, but nothing which will alter the principle upon which the plan is based. The depths of sewer on several streets in the smaller divisions seem too small to give good results for cellar drainage, unless house foundations are higher than the street. A minimum depth of five to six feet for level ground should be secured, to permit sufficient fall from the cellars to prevent water backing into them from the sewer pipes. Flush-tanks are not provided throughout the system, partly because it is not the intention to admit house-drainage to all, and partly because the proposed water supply will not cover the same ground as the sewer system, and, therefore, it will be necessary to flush part of the sewers with movable tanks or long lines of hose. A plan for the outlet below the canal is not presented, because, I understand, the State uses this portion as a drain to dry out the bed of the canal when the water is drawn off, and will construct this outlet partly or wholly. A proper co-ordination of the plan for this outlet with the adopted plan for the sewer system should be secured.

All streets in the village in which it is deemed possible to lay sewers at reasonable cost are included in the plan, but it is not the intention to construct them all at once. Those portions omitted can be brought in at any time that it seems desirable. Those portions of the village that are not yet laid out can be brought into the system or be treated separately whenever they require sewerage.

It will be noticed in the engineer's report that it is intended to discharge the sewage directly into Oak Orchard creek. That report gives the reasons advanced by the village authorities for this procedure. The map shows that this discharge is to take place at six places, viz.: (1) Near the south end of the village, the outlet for sewers on Upper Church, Elm, Chestnut and Hedley streets; (2) one from Oak Orchard street east of the creek;

(3) one from Orient and Church streets and Oak Orchard street west of the creek; (4) one from North, Elizabeth and State streets and Center street east of the creek; (5) one from Orient, Church, Shelby and Starr streets and Center street west of the creek; (6) the main outlet for all the rest of the village, at a point below the village in the deep gorge through which the creek flows. All these outlets but the last are in or near thickly settled parts of the village, above dams and raceways which are in close proximity to buildings. The intention of the commissioners in laying out the lines having the outlets described in the first five is stated to be to provide a system for cellar drainage only, it being their belief that the people living in this district will not make sewer connections for other purposes. The system can, however, be used for these other purposes by any one so desiring, under present rules. Water will probably be supplied to but a small portion of this territory for some years, and so there would in any case be but few water-closets in the district. I see no reason for supposing that connections for house drainage other than water-closets should not be made by every one putting in a cellar drain, as the additional expense would be very slight. The first, third and fifth of the districts described above could be combined in one by increasing the amount of excavation somewhat, and the second and fourth could be added by the use of inverted syphons under the creek, or of protected pipes on bridges over it. This combination would cost some money, but it would concentrate the flow from the five districts at a point at or near the outlet of the fifth district, say at the intersection of Center and Orient streets. This would not help matters very much unless the sewage can be carried from this point to the main outlet. This will be a difficult thing to do as the natural line for such a connecting pipe is well built up with business blocks and store-houses, and is further obstructed by the canal and mill races. It may be found more economical to pump the sewage from the five combined districts up the ten feet necessary to discharge it into the main system where it crosses [illegible]. Either method of making the connection, [illegible] considerable expense. This expense is [illegible] by the apparent necessities of the case, [illegible] citizens whom I saw, especially as it seems [illegible] only a portion of this part of the system [illegible]

at any time within a number of years. Should the use of these pipes be restricted to cellar drainage, and their use for other purposes be strictly prohibited, there could be no objection to the discharge of their contents into the creek. It should be borne in mind that a very considerable curtailment of the usefulness of the sewers is thus made, and a very careful consideration should be given the question by the commissioners before construction is decided upon.

With these five districts disposed of, either by connection with the main system or by restriction of their use to cellar drainage, the question of the disposal of the sewage from the sixth district, including nearly all the village, may be considered. It is now proposed, as stated above, to discharge this sewage through a sewer to be constructed by the State, along with a certain amount of drainage or leakage from the Erie canal, into Oak Orchard creek at a point below the village, and below all dams now in existence on the creek. This point is at a considerable distance from any of the houses of the village, and the nearest mill-site is several miles down the stream and is now abandoned, I understand, and the dam at least partially washed away. The Engineer has made a very conservative estimate of the amount of water flowing in the stream, judging from the data given in the report on the Oak Orchard swamp, published in the Fourth Annual Report of the State Board of Health (1884), and the dilution of sewage will, for many years be much greater than his figure ($\frac{1}{300}$), and will probably never reach that figure. The flow of the stream is equalized by the storage of water in the swamp, as shown in the report above referred to, and does not become subject to such great fluctuations in flow as most of our smaller streams. The flow below the canal is further increased during the period of canal navigation by the flow over the canal waste-weir, so that we have as favorable conditions as can be found in a small stream for the reception of sewage. The peaty color of the water, due to its period of storage in the swamp, indicates that it should not be used for potable purposes if any other water can be found; and, as a matter of fact, I believe it is not so used. Below Medina there are on the creek only two or three hamlets, with two or three mill privileges which have practically gone out of use, so that there is no reasonable objection to be made to the discharge of raw sewage into the stream at this time. Should the Oak

Orchard swamp be drained, as proposed, or should the management of the canal be materially changed at this point, objections due to deficiency of flow in summer, might arise. Neither of these contingencies is likely to arise for many years, but their possibilities should be considered, and the necessity of purification of the sewage before entrance into the stream in case the slightest permanent nuisance is created, should be kept prominently in view. The concentration of the summer flow in a single narrow channel at, and for some distance below, the proposed point of discharge, seems to be all that could be expected.

Respectfully submitted.

CHAS. C. BROWN, C. E.

Plans for the Sewerage of Walton.

UNION COLLEGE SCHOOL OF CIVIL ENGINEERING,
SCHENECTADY, N. Y., *May* 6, 1890.

To the Board of Sewer Commissioners of the Village of Walton:

GENTLEMEN.— I have the following report to make on the plans for a system of sewers for your village, presented herewith, as required by the instructions of the State Board of Health.

The village is very favorably situated, as regards surface drainage, with three brooks through the territory, and the Delaware river separating the village into two independent portions. With such facilities for disposing of surface drainage there is not the slightest question that the surface water can be taken care of by drainage channels on the surface at a very small fraction of the cost necessary to construct underground channels. This is so self-evident that I have not considered it necessary to present any figures of comparative cost. It will be necessary to grade some of the streets a little to allow a free escape of the surface water, but the village is extremely fortunate, since the amount of such grading is no more than is actually needed to put the streets in good condition.

As regards roof drainage much the same statement can be made. Upon a low estimate of the amount of roof water to be carried, if all roofs are connected with the sewers, we found that an outlet sewer of about twice the diameter of that selected would be necessary. This drainage can as readily be taken care of as the street drainage over the surface. The only other advantage to be gained from admitting roof water to the sewers is that of its flushing action. The necessity for frequent flushing will be increased by the necessary increase in size of pipes, but the discharge of roof water will be at indefinite and unequal intervals. A surer action of the flushing water can be obtained by the use of flush-tanks. This method will also be the cheaper I believe. The cost of tanks and of flushing water will not be equal to the

added cost of the larger pipes needed if the roof water is depended on, and the expense of cleaning and removing stoppages will be less.

The business portion of the village and the residence portion adjacent thereto is so near the level of the river, and is underlaid by so extremely porous a subsoil, that the subsoil water answers at once to every change of level of the river or of the brooks. For this reason it is believed that no adequate drainage of the cellars in this part of the village can be effected, and this matter has been neglected until the higher portions of the village are reached. A great reason for this is the added cost that would be necessary for lowering the sewers on the streets through the low district, owing to the fact that the additional excavation would be below the surface of the ground water and therefore very expensive to make and keep open until the sewer pipe was thoroughly well placed in position. This added cost is believed to be much greater than any slight benefit to be derived by it.

Another reason for making the depth of sewer as light as possible and still be low enough to receive all connections for sewage is the necessity of having fall enough to discharge the sewage into the river without pumping. This result can be attained for any depth of pipe below the surface, but at the expense of additional pipe for each addition of depth, necessary to reach the river at a lower elevation. We have tried to strike the happy medium. Line B of the map and profile is the one finally selected.

Upon the profiles of some of the lower streets, notably Delaware, Liberty, Townsend and North, of those probably to be built earliest, will be noticed blue lines marked "required grade" or "proposed grade." The final location of the outlet sewers for greatest economy placed the tops of sewer pipes at these places rather near the surface of the street. It was evident that these streets should be graded the small amount required to give them a regular slope in order to dispose of their surface drainage to the best advantage. This was, therefore, taken into the account and if the sewers are to be constructed at the proposed depths, the streets marked so must be graded up to the lines drawn on the profiles. The best time to do this grading is immediately after the sewer is laid and accepted, as some excavation for the sewer will thus be saved and the new street will not be torn up.

When the sewers east of East Brook are constructed, it will be necessary to place an inverted siphon under the brook, unless that district is discharged directly into the river, which could be done if it were not for the slight danger of some deposit of objectionable matter along the front of the village, especially when the water backs up at flood time. Also the backing up of water in the sewers of this district would be greater than if it were connected with the main system, owing to the greater elevation of the outlet and the greater height of flood rise at that point. A connection can be made with the brook where it crosses Griswold street, to give a constant flushing stream in the siphon. A similar construction will be required at the crossing of West brook, and it can be similarly treated.

It is found to be most economical to combine the entire system in one, in this manner, as only one outlet across the flats will thus be necessary. Enough man-holes and lamp-holes have been provided for in the plans to give free access to all parts of the system and make the task of keeping the sewers clean as light as possible. It is believed that they will keep themselves clean, so far as proper sewage is concerned, but all sewers are liable to stoppage from improper objects introduced into them. It is probable that the sewers will need some attention at times before the entire system is constructed, but we have tried to make this probability as small as possible by inserting a number of flush-tanks. It will be seen that flush-tanks are located at the end of every branch. All these tanks would not be inserted if the entire system was constructed at once. It is advised that flush-tanks be inserted as located on all lines built at first, and when extensions are made, some of these tanks can be changed in location. Then too flush-tanks can be placed in man-holes at the end of constructed lines and when the lines are extended the flushing apparatus can be removed to the upper end of the system and the old tank converted into a man-hole. The matter of a water supply for the flush-tanks has been carefully considered, and the conclusion at which I have arrived is that the most economical source of supply is the pipes of the water company. Any other supply would amount practically to a duplicate system of water works, except that the sizes of pipe would be smaller. Each flush-tank is of about 200 gallons capacity and will probably be set to empty once in eighteen to twenty-four hours. An estimate of the amount of

water used per day can thus be made when the number of tanks to be put in is decided upon.

The portion of the system on the south side of the Delaware river is independent of the rest and presents no particular points for remark. The area near the south line of the village will find an additional independent outlet.

I may say, regarding a lowering of the grades of the sewers on the lower streets of the north side, that such lowering would require resort to line A of the map for an outlet, a much longer line than the one selected; an increased depth of excavation, almost all additional depth being below the level of ground water. The advantages to be gained would be simply the removal of the necessity for inverted siphons under the brooks and a less amount of grading on eastern Delaware street. The removal of the necessity of grading other streets can hardly be called an advantage, as they must be graded at some time in any event.

The matter of sewage disposal has been carefully considered. It became evident at once that no system of purification of sewage was possible without raising the sewage to a higher level than the outlet, or carrying it a long distance down the river. I would refer to my former report for a discussion of the advisability of admitting the sewage untreated into the river. Further investigation has given me the opinion that it will probably never be necessary to purify the sewage of Walton before discharge into the river. All corporations on the Delaware river in the State of New York that are likely to put in systems of water-works are so situated that their most available supply is to be obtained from mountain streams, and it is highly improbable that any of them will ever resort to the Delaware for water. The size of the stream is such that there is no danger of the sewage from a village at or below Walton producing a nuisance in the stream or on its shores, or interfering with any probable use of the river for any other purposes, nor will it be injurious to fish. We have, however, considered the best place for purification, and find it to be in the neighborhood of the fair ground. The sewage from the north side of the river can be brought over by a pipe under the river on the dotted lines laid down on the map, and pumped up for treatment with the sewage from the south side. At this place there is at present room enough for the application of any of the common methods of sewage treatment.

The portion of the system on the northern side of the river has been designed for a population of 5,000, distributed over the streets whose profiles are shown. This population is nearly three times as great as that now on that territory and is thought to be a large estimate of the increase within any reasonable number of years, especially as a tendency to settlement on the other side of the river seems to be developing. The present population is distributed over the streets upon which sewers are located, with a few scattered houses in other localities. Portions of the village, as yet undeveloped, can all be easily taken care of when the necessity arises.

I wish to express my indebtedness to Mr. F. E. Abbott for his excellent work on the surveys and maps and his valuable assistance in preparing the plans. His work in producing neat, clear and readable drawings speaks for itself.

Respectfully submitted.

CHARLES C. BROWN, C. E.

SPECIFICATIONS FOR FURNISHING MATERIALS AND CONSTRUCTING SEWERS IN THE VILLAGE OF WALTON, DELAWARE COUNTY, N. Y.

SPECIFICATIONS FOR MATERIAL.

Sewer Pipe.

The sewers shall be constructed of the best quality of vitrified, salt-glazed, sewer pipe, sound and well burned, with perfectly clear ring, well glazed and smooth on the inside and free from broken blisters, lumps or flakes which are thicker than one-sixth of the normal thickness of the pipe and whose largest diameters are greater than one-eighth of the inner diameter of said pipe. Furthermore, if the broken blisters, lumps or flakes of any size, on pipe or specials, can not be laid and properly fitted in such manner as to bring said defects on the upper side of the sewer, the said pipe or special shall be rejected. Pipes having fire checks or cracks of any kind extending through the thickness shall be rejected. All straight pipe shall be in lengths of not less than three feet. All Y and other specials shall be at least two feet long and of the same quality and manufacture as the plain pipe. Pipe that varies from a straight line more than one-fourth



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of an inch per foot in length, or which varies in any two diameters more than one-twenty-fourth of the regular diameter of the pipe at either bell or spigot end shall be rejected. No pipe shall be used that has a piece broken from the spigot end deeper than one and one-half inches, or longer, measured in the middle of the fracture, than one-fourth the diameter of the pipe. No pipe shall be used that has a piece broken from the bell end if the fracture extends into the body of the pipe, or if its length measured as above is greater than one-sixth the diameter of the pipe. All hubs or sockets must be of sufficient diameter to receive to their full length the spigot end of the next following pipe or special without any chipping whatever of either, and also to leave a space of not less than one-eighth of an inch in width all around for the cement-mortar joint. All pipes and specials which cannot thus be fitted into each other shall be rejected. The depth of the hub of any pipe shall be at least one inch greater than the thickness of the said pipe. All pipes shall be of standard thickness. Y branches will be four inches in diameter, and will average one for every twenty-five feet of sewer. T branches for lamp-holes will be of the same size as the sewer pipe at their points of location as shown on the plans.

Iron pipe and castings.

All iron pipe must be without flaw or defect, save that minor defects which may be laid at the top, and which do not affect the strength or tightness of the pipe for the purposes for which it is intended, may be allowed. Other iron castings must be true in form, of full weight, and free from all defects which can in any way lessen their usefulness or durability. Flush-tank and man-hole covers and rings and steps are shown on the drawings. Covers must weigh not less than 325 pounds. Lamp-hole covers are also shown; they must weigh not less than 250 pounds.

Y covers.

Y covers must be of zinc or galvanized iron, about one-twentieth of an inch thick, and cut to fill the hole of the Y loosely.

Brick.

All brick shall be hard burned so as to give a clear ring when struck together, and shall be in true form. All half or broken bricks will be rejected.

Cement.

All cement must be equal in quality to the best quality of Rosendale, and shall have a tensile strength after twenty-four hours of eighty pounds per square inch. Portland cement shall be of first quality and show a tensile strength of not less than 100 pounds per square inch after twenty-four hours. The contractor must furnish samples for testing from each barrel should the engineer or inspector so direct.

Sand.

Sand shall be sharp, clean and not of excessive coarseness.

Stone.

Stone for concrete shall be broken so as to pass through a two-inch ring.

Oakum.

Oakum may consist of flax, jute, manilla or hemp. It must be twisted in the form of a loose rope.

Flush-tanks.

Flush-tanks must be either of the Van Vranken or the six-inch Rhodes-Williams patent, on eight-inch pipe or the five-inch size on six-inch pipe, and must be accompanied by a guarantee against damages for infringement of patent, satisfactory to the board of sewer commissioners. In addition to the flushing apparatus, the following must be furnished for each tank: One piece three-quarter-inch iron pipe, eighteen inches long, with brass ferrule; two elbows; one piece of three-quarter-inch iron pipe, twenty-four inches long; one shut-off cock, three-quarter-inch, lever handle, female screws; one one-eighth-inch air or pet-cock with three-quarter-inch male screws; one three-quarter-inch lever handle straightway cock with one male screw; two iron staples six inches long, and sufficient three-quarter-inch iron pipe to reach the nearest water main, on the average not over thirty-five feet for each flush-tank. All cocks must be brass.

SPECIFICATIONS FOR LABOR OF CONSTRUCTION.

Classes of material excavated.

All material excavated will be classed under one general head—earth, and no modification or change in classification will be made.

Excavation of ditch.

The ditch shall be excavated along the line designated by the engineer, and according to the depths given by him. The contractor shall notify said engineer when he desires a new street laid out, and shall furnish him all the manual assistance he desires for this purpose, as well as all stakes, spikes and grade boards that may be required. The engineer shall limit the amount of street to be opened in advance of the work. The engineer may order any ditch braced, sheeted or floored that he may deem necessary; nor shall the contractor receive any extra pay for lumber used unless the same be left in the ditch by order of the engineer The width of the ditch on the bottom must be at least one foot greater than the outer diameter of the pipe. When rock is to be excavated it shall be taken out twenty feet in advance of the laying of the pipe or sewers and six inches below the grade of the outer bottom of the pipe or sewer, and then the trench filled up to the level of that grade with clean, sharp sand or clean gravel and thoroughly rammed and made solid. When blasting is resorted to for making excavations, the trench shall be carefully covered on the top and sides with heavy timbers and planks to prevent fragments from being thrown out. All damages or injury to persons or property resulting from blasting operations, or from neglect in properly guarding the trenches, must be paid by the contractor, and no compensation to said contractor for losses thus incurred will, under any circumstances, be allowed. The material excavated shall be laid compactly on the side of the trench and kept trimmed up so as to be of as little inconvenience as possible to the traveling public and to adjoining tenants. At such street crossings and other intermediate points as may be directed by the board of sewer commissioners or the engineer, the trenches shall be bridged in a proper and secure manner, so as to prevent any serious interruption of travel upon the roadway and sidewalks of such street, and also to afford necessary access to particular public and private premises. The material used and the mode of constructing such bridges and the approaches thereto must be satisfactory to said board and engineer, and the cost of all such work must be included in the regular price bid for the sewer. Before each pipe is put in place, the bottom must be excavated under its end to receive the socket, so that the whole length of the pipe will lie firmly on the graded bottom of the trench. After the joint has

been cemented, this excavation must be carefully filled with sand or dry earth to support the cement firmly in its place. The contractor shall do whatever may be necessary to keep in position and protect from injury all water and service pipes, and all other fixtures which may be met with in carrying on the work. In case any of the said water pipes or other fixtures are damaged, the expense of repairs to the same shall be paid by the contractor. All excavations, embankments, rubbish heaps and other obstructions incident to the work must be protected by barricades and lights to prevent accidents to passengers on the streets, and special precautions must be taken to secure the safety of buildings and property near the excavation. All the village ordinances relating to such precautions and safeguards must be faithfully observed by the contractor, he holding himself personally amenable for any disregard or violation of them by his employés or agents or any damage resulting from the same. The contractor shall provide for all water-courses and drains interrupted during the progress of the work, and for all structures over such water-courses and drains, and replace them in as good condition as he found them. The contractor shall not obstruct the gutters of any street or road, excepting where the line of sewer is located in the gutter, but in any case he shall provide for the passage of surface water along the street. No street monument shall be disturbed by the contractor until the permission of the engineer is given therefor.

Pipe laying.

No pipe shall be laid except in the presence of the engineer or his authorized inspector. The contractor shall notify the engineer whenever he is ready to lay pipe in any particular ditch. The engineer shall have the power to order the removal and relaying of any pipe laid against his orders or during his absence from the work. The engineer shall use such means as he deems proper for having the pipe laid properly to grade, and the contractor shall provide him all manual labor, stakes, twine or grade-boards necessary for that purpose. Should the ditch be excavated below the required depth, the contractor shall fill the same to grade with material at his own expense, and tamp it thoroughly before laying down the pipe. The pipes and specials shall be so laid in the trench that after the sewer is completed the interior surface thereof shall conform on the bottom accurately to the grades and alignments fixed and given by the engineer. The main sewer will

be divided by man-holes and lamp-holes into a number of divisions or working sections, in each of which the grades and alignments shall, under ordinary circumstances, be truly straight. Changes of grade or direction, or both, in said sewer, will generally be made at lamp-holes or man-holes. The joints between the pipes shall be caulked with jute or oakum to prevent the entrance of cement into the interior of the pipes, and made perfectly water-tight by completely filling out the entire annular space between the exterior of the spigot end and the interior of the hub with cement. In dry ditches Rosendale cement shall be used in joining the pipes, but Portland cement shall be used in the wet ditches, should the engineer desire. To insure water-tight joints, the engineer may direct that the following method of jointing the pipe be used: Each length or strand of the jute shall be of a diameter to loosely fit the width of joint and shall be of a length to go once around the circumference of the pipe and lap over two or three inches, and shall be thoroughly soaked in a Portland cement-mortar made of a thick paste of clear cement and water. This shall be driven home with caulking tools and shall be succeeded by a sufficient number of strands to fill the joint room to within one-half inch of the outside of the bell, breaking joint with the laps all driven home and thoroughly joined together. The joint shall then be finished by filling the remaining one-half inch of joint room with a clear Portland cement, the joint room, when finished, being completely filled all around the pipe to the outside lines of the bell. The contractor will furnish the pipe-layer with a bag, stuffed with shavings or hay, of a size sufficient to fit the pipe rather tightly, with a rope about ten yards in length fastened at one end to the mouth of the bag. The bag must be placed in the first pipe, the rope passing through each pipe as it is laid down. After the joints are made, the bag is to be drawn forward at such times before the cement is set as to smooth off and produce a true surface at each cement joint, and a continuous thin coating of cement on the lower half of the pipe. The joint being finished, great care must be taken not to disturb the pipes by stepping on or near them, by throwing earth upon them from the bank or otherwise. Iron pipe shall be laid with lead joints and be tight.

Y Branches.

The contractor shall place Y branches in the pipe sewers wherever the engineer may direct. They shall be closed with a

sheet-iron cover plastered with an inch of mortar. The contractor shall allow no person to make connections with the Y in the street sewer except under written orders from the board of sewer commissioners. But should the line of pipe sewer cross any private drain in such a way as to injure the same, the engineer shall have the right to direct the connection of such drain with the sewer. Y branches will be four inches in diameter and will average one for every twenty-five feet of sewer. When removing the caps from the branches to join branch lines with the sewer, great care will be taken to prevent the entrance of earth, mortar, etc., into the sewer.

Man-holes.

Man-holes shall be constructed of eight-inch brick-work laid in cement mortar. They shall be plastered on the outside and washed with a coat of clean cement on the inside. They must be four feet inside diameter at the bottom and two feet four inches at the top. Cast-iron steps of the form shown on the plans shall be placed at intervals of fifteen inches. The man-holes shall be covered with an iron ring and cover of the form shown on the drawings, weighing not less than 325 pounds. All sewer channels in man-holes, unless otherwise ordered, shall be of split sewer pipe backed with concrete. Branches shall be put in all man-holes where directed and their outer ends securely closed.

Lamp-holes.

Lamp-holes shall be constructed by carrying up straight pipes from a T in the sewer to within six inches of the surface. An iron ring and cover, weighing not less than 250 pounds, shall be placed upon a brick foundation about the top of each pipe so carried up. All lamp-holes shall be constructed of the same size pipe as the sewer in which they are located.

Flush-tanks.

Flush-tanks shall be five feet in diameter at the bottom, for six-inch flushing apparatus, or four feet for five-inch flushing apparatus, with the sides carried up straight for a distance of four feet above the flow line of the pipe. They shall be of eight-inch brick work, plastered inside and out, and must be covered with a light iron cover of the form specified for man-holes. The emptying apparatus must be set according to the direction of the engineer. Concrete foundations must be placed under all man-holes and flush-tanks.

Mortar.

Mortar for brick work shall consist of one part of cement and two parts of sharp, clean sand, mixed dry. Only pure cement will be used in jointing pipes. No mortar is to be used after it has begun to set.

Concrete.

Concrete shall consist of one part of cement, two of sand and three of broken stone. The materials must be mixed dry before using. When it becomes necessary to make concrete by grouting, no sand shall be used, but the grout shall be made of pure cement.

Closing pipe at night.

When the branch is left for the night, or the pipe-laying is stopped by storms, care will be taken that the end of the line of pipe is closed water-tight with a wooden plug and cement, or with bricks laid in lime mortar.

Back filling.

In back filling great care should be taken not to disturb the pipes by throwing earth upon them from the top of the ditch or by walking upon or by the side of them before a covering of at least two feet has been made. The earth shall be carefully tamped around and about the pipe by such means as the engineer shall direct and to a depth of two feet before using heavy tamps. After a small portion of the pipe has been covered to the depth of two feet, a man will stand on the filling and will continue this depth along the whole line by carefully placing over the pipes ahead of him such fine dry earth as shall be shoveled to him by men above. In completing the filling above two feet, the same will be rammed in layers of about one foot with twenty-five-pound rammers. In crossing streets, sidewalks, gutters and other places over which there is a great amount of travel, however, more attention will be given to making the filling compact than in unfrequented localities, and where the engineer requires it a portion of the street will be planked. In filling the number of men ramming shall not be less than one-third the number of men shoveling, or the trench may be filled with water with the permission of the engineer.

Restoration of streets.

The contractor shall restore the surface of the streets to as good condition as they were before being entered upon by him. The refilled earth must not be heaped more than six inches above the

original surface, and the line of the ditch must be passable to traffic within three days after the pipe is laid. The contractor shall use all pains to preserve the original excavated surface when the latter is a better material for road surface than the subsoil. All the work of restoring surface of streets and replacing pavements, crosswalks or curbs shall be done to the satisfaction of the board. All streets must be cleaned up and placed in a neat and orderly condition before the work contained in that portion is included in any monthly estimate. All surplus earth and material must be cleared away, and any deficiency of material that may become necessary to restore the street to its proper condition must be supplied by the contractor.

Removal of rubbish by the board.

Should the contractor leave any earth or material on the streets during the progress of the work, the engineer shall notify him to remove the same. Should the contractor refuse to do so within three days, the board may cause the same to be removed and the expense thereof shall be deducted from any moneys due or to become due to the contractor.

Prices bid.

The price bid for each man-hole will be a lump sum which must include the cost of additional excavations and furnishing and putting in place all necessary materials, such as concrete foundations, masonry, invert, junctions, step-irons, flagstone, coping, cast-iron covers, etc., complete. The price bid for each lamp-hole will be a lump sum and shall include the cost of furnishing and putting in place all required sewer pipe, the cast-iron box and cover, also the brick and concrete needed in the foundation of the ring and cover. The price bid for each flush-tank must include furnishing and putting in place all brick and iron work, the pipe, specials and covers used for overflow and lamp-hole and the apparatus for discharging the flush-tank. The prices bid for furnishing and laying iron pipe must include the extra work due to its position, such as passing under railroads, creeks or culverts. The prices bid for sewer pipe shall include the cost of furnishing and laying all straight pipe and specials. Specials will include four-inch Y's, T's for lamp-holes, bends for overflow pipes for flush-tanks, and such other specials as the

engineer may require. Y's will average one for each twenty-five feet length of sewer. The number and location of lamp-holes, man-holes and flush-tanks are shown on the drawings. The prices bid must include the delivery of all materials in good condition on the work at such times and places and in such quantities as the engineer may require. The length of sewer pipe furnished and laid will be measured on the center line of the pipe as laid, and to and from the centers of all man-holes, flush-tanks, lamp-holes or junctions.

Inspection.

All the work contemplated by these specifications shall be done to the satisfaction of the engineer and board of sewer commissioners, and all materials and workmanship of whatever description furnished and performed by the contractor shall be subject to the inspection and rejection of said engineer and board, and their duly authorized agents. Whenever unfaithful or imperfect work is discovered, it shall be corrected and repaired immediately upon the requirement of said engineer notwithstanding that it may have been passed over or overlooked by an inspector. The inspection of the work is not intended to relieve the contractor from any of his obligations to perform sound and reliable work as herein described.

Explanations and corrections.

The meaning and intent of these specifications, where any obscurity may appear, will be explained and defined by the engineer who will likewise give all directions and determinations necessary for the due and full effect to any of the provisions of the said specifications.

Disorderly workmen.

The engineer shall have the right to order the discharge of any disorderly or incompetent person employed by the contractor, and such person shall not be re-employed.

CHARLES C. BROWN, C. E.

PLANS

FOR

Sewerage of Suspension Bridge.

GENERAL SPECIFICATIONS FOR THE CONSTRUCTION OF SEWERS IN THE VILLAGE OF SUSPENSION BRIDGE, N. Y.

Sewer Pipe.

The sewers shall be constructed of the best quality of vitrified, salt-glazed sewer pipe.

Iron Pipe and Castings.

All iron pipes must be without flaw or defect that will affect the strength or tightness of the pipe for the purpose for which it is intended. Other iron castings must be true in form, of full weight and free from defects which will lessen their usefulness or durability.

Brick.

All brick shall be hard burned so as to give a clear ring when struck together and shall be true in form. All half or broken bricks will be rejected.

Cement.

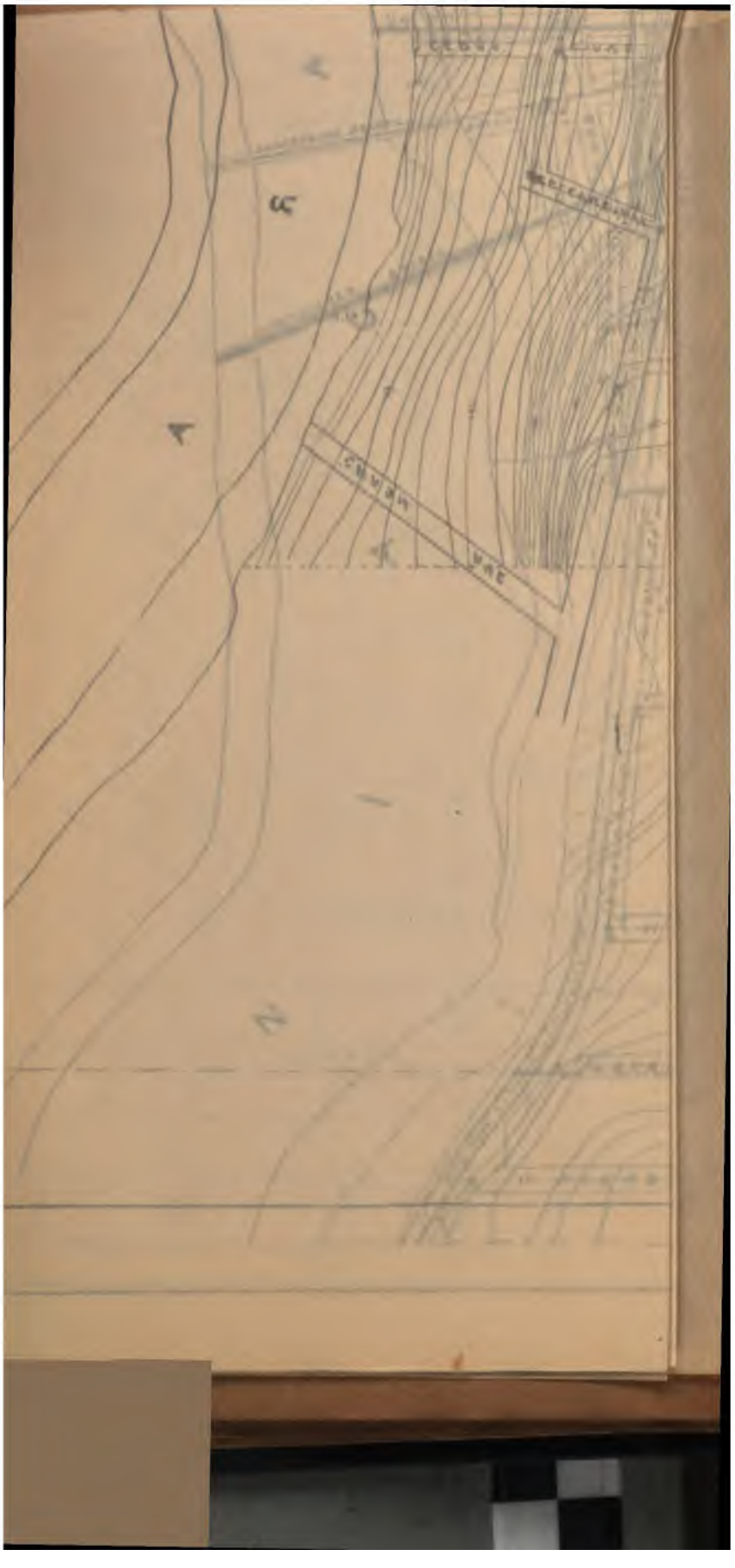
All cement must be equal to the best quality of Rosendale, and shall have a tensile strength after twenty-four hours of eighty pounds per square inch. Portland cement shall be of first quality and show a tensile strength of not less than 100 pounds per square inch after twenty-four hours.

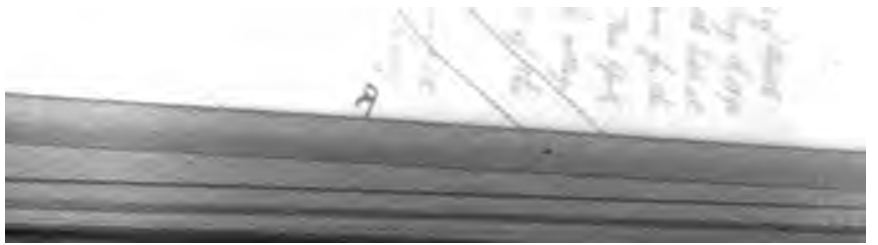
Sand.

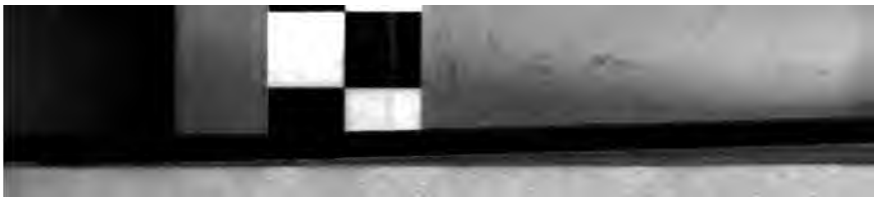
Sand shall be sharp, clean and not of excessive coarseness.

Stone.

Stone for concrete shall be broken so as to pass through a two-inch ring.







OAKUM.

Oakum may consist of flax, jute, manilla or hemp. It must be twisted in the form of a loose rope.

EXCAVATION OF DITCH.

The ditch shall be excavated along the line designated by the engineer according to the depths given by him and in the manner prescribed by him. The width of the ditch on the bottom must be at least one foot greater than the outer diameter of the pipe. When rock is to be excavated it shall be taken out twenty feet in advance of the laying of the pipe or sewers, and six inches below the grade of the outer bottom of the pipe or sewer, and then the trench filled up to the level of that grade with clean, sharp sand or clean gravel, and thoroughly rammed and made solid. Before each pipe is put in place, the bottom of the trench must be excavated under its end to receive the socket so that the whole length of the pipe will lie firmly on the graded bottom of the trench. After the joint has been cemented, this excavation must be carefully filled with sand or dry earth to support the cement firmly in its place.

PIPE LAYING.

No pipe shall be laid except in the presence of the engineer or his authorized inspector. The engineer shall use such means as he deems proper for having the pipe laid properly to grade, and the contractor shall provide him all manual labor, stakes or twine necessary for that purpose. The pipes and specials shall be so laid in the trench that after the sewer is completed the interior surface thereof shall conform on the bottom accurately to the grades and alignments fixed and given by the engineer. The main sewer will be divided by man-holes and lamp-holes into a number of divisions or working sections, in each of which the grades and alignments shall, under ordinary circumstances, be truly straight. Changes of grade or direction, or both, will generally be made at man-holes or lamp-holes. The joints between the pipes shall be caulked with jute or oakum, to prevent the entrance of the cement into the interior of the pipes, and made perfectly water-tight by completely filling out the entire annular space between the exterior of the spigot end and the interior of the hub with cement.

Iron pipe shall be laid with lead joints and be tight.

Y BRANCHES.

The contractors shall place Y branches in the pipe-sewers wherever the engineer may direct. They shall be closed with a sheet-iron cover plastered with an inch of mortar.

MAN-HOLES AND CATCH-BASINS.

Man-holes and catch-basins shall be constructed of eight-inch brick work laid in cement-mortar, according to drawings to be furnished. They shall be plastered on the outside and washed with a coat of clear cement on the inside. The man-holes shall be covered with an iron ring and cover of the form shown on the drawing. All sewer channels in man-holes, unless otherwise ordered, shall be of split sewer pipe backed with concrete.

LAMP-HOLES.

Lamp-holes shall be constructed by carrying up straight pipes from a T in the sewer to within six inches of the surface. An iron ring and cover, weighing not less than 250 pounds shall be placed upon a brick foundation. All lamp-holes shall be constructed of the same size pipe as the sewer in which they are located.

MORTAR.

Mortar for brick work shall consist of one part of cement and two parts of sharp, clean sand, mixed dry. Only pure cement shall be used in jointing pipes. No mortar is to be used after it has begun to set.

CONCRETE.

Concrete shall consist of one part of cement, two of sand and three of broken stone. The materials must be mixed dry before using. When it becomes necessary to make concrete by grouting, no sand shall be used, but the grout shall be made of pure cement.

BACK-FILLING.

In back-filling great care should be taken not to disturb the pipes by throwing earth upon them from the top of the ditch, or by walking upon or by the side of them before a covering of at least two feet has been made.

RESTORATION OF STREETS.

The contractor shall restore the surface of the streets to as good condition as they were before being entered upon by him.

Inspection.

All the work contemplated by these specifications shall be done to the satisfaction of the engineer and board of sewer commissioners, and all materials and workmanship of whatever description furnished and performed by the contractor, shall be subject to the inspection and rejection of said engineer and board and their duly authorized agents.

Explanations and Corrections.

The meaning and intent of these specifications, where any obscurity may appear, will be explained and defined by the engineer, who will, likewise, give all directions and determinations necessary for the due and full effect of any of the provisions of the specifications.

CHARLES C. BROWN,
Civil Engineer.

REPORT

ON

Proposed Change in Plans for Sewerage of Waterville.

UNION COLLEGE, SCHOOL OF CIVIL ENGINEERING,
SCHENECTADY, N. Y., *July* 14, 1890.

LEWIS BALCH, M. D., *Secretary State Board of Health, Albany, N. Y.*

SIR.—I have the following report to make on the suggested change in the plan for the sewerage of the village of Waterville. On account of an adverse vote last year the village has been unable as yet to construct any of the sewers as laid down on the plan. This plan proposed to take care of the sewage and a portion of the roof water only, and did not propose to take care of street drainage. The village authorities are proposing to construct a tile drain to carry off the discharge from some subsoil drains together with some surface drainage, whose source is such that some water flows in the gutters for a good part of the year. There is no water in the said gutters at this time, and probably will not be as a permanent stream until the fall rains set in. The proposed tile drain will discharge into another already laid and thence into one of the brooks flowing through the village, which is also dry for a portion of the year. Part of the course of the drain is on White street. The residents of White street propose to construct a sewer which shall take this surface drainage and also the sewage from their houses, in place of the tile drain. The course of the sewer would be down White street to its intersection with the Main street, whence it would go a short distance and discharge into the stream mentioned above at a point further down in its course. This sewer would be on the line of the plan to the Main street corner, and a temporary outlet into the stream is desired to be used until the outlet sewer provided *for in* the plans is constructed.

I think that the change in the plan is not proper, for the following reasons:

1. It is not contemplated that the sewers should carry surface water, and therefore the size of the outlet sewer must be increased if this surface water is to be admitted. It will be more economical to construct the cheap tile drain necessary to carry the surface water to the stream at the nearest point than to construct the long outlet of the necessary larger size.

2. The proposed place of discharge is in a large arched culvert under the street, with a flat bottom of planks over which the water flows in a very shallow stream, when it does not flow under them, and which is dry for a portion of the summer. This stream already receives much sewage from houses on or near its banks, and in dry seasons gives rise to much nuisance. It is one of the streams mentioned in my former report as in this condition, and I wish to renew with emphasis my recommendation that what pollution now gets in should be prohibited, and to say that in my opinion no additional pollution should be allowed to enter. A dry season will give the local board of health considerable work to do in suppressing the nuisance that will be generated here. Premonitory symptoms were apparent at the time of my visit. Should the outlet be carried down the stream a short distance, as proposed by some, the condition would be but little better as the sewage would then be discharged into a shallow mill-pond and would produce a less nuisance because it would be a little less confined and is not close to so many dwellings and business houses, but it would still produce more of a nuisance than should be permitted. Then, too, the additional length of pipe necessary to carry the outlet down would be outside of the general plan and would be thrown away when the main outlet was constructed. I looked over the course of the main outlet again, and the stream, to see if it would be possible to shorten the line any, but I can not recommend such a proceeding. The size of the stream increases rapidly below the village but it does not reach a size sufficient for the reception of the sewage from the village until the point for the outlet as shown on the plans is reached.

I wish to call attention again to the condition of the first stream mentioned above and of the other stream running through the village and to impress upon the board of health an idea of the work that lies before them in suppressing the nuisances that will

here arise upon very slight provocation. Both streams evidently receive much sewage and neither is fit to receive it, the one on account of the lack of water and the other on account of the mill ponds on its course within the village limits. There is but one way to reduce the nuisances and that is to prohibit the discharge of sewage into the streams. In my opinion this should be done at once before a favorable season allows the outbreak of some disease generated by the present bad conditions. Such an outbreak would be an unanswerable argument in favor of sewers and would lead to their early construction. But if the certainty that the natural increase in the present bad conditions will produce the outbreak can be brought home to the people the cause will be removed without paying the fearful price of disease and death for the demonstration of a fact that has already been demonstrated many times.

Respectfully submitted.

CHAS. C. BROWN,
Civil Engineer.

WHITE PLAINS.

Application for Modification of Plans for Sewerage and Drainage.

The following plan for modification of the sewerage system was submitted and approved.

A dispute about the working of the system having arisen, the State Board of Health was requested to send an engineer to examine into the question. The following is his report:

REPORT ON INSPECTION OF SEWERS IN THE VILLAGE OF WHITE PLAINS.

By Charles C. Brown, C. E.

Union College,
Schenectady, N. Y., *February* 18, 1890.

To the Board of Trustees of the village of White Plains, N. Y.:

Gentlemen.— In response to your resolution of January thirty-one, I was requested by the secretary of the State Board to make an inspection of your sewer system now under construction. The text of that resolution is as follows:

"*Whereas*, Many of our taxpayers having heard the various rumors which allege that members of this board are in collusion with the contractor, and having noted the frequent newspaper attacks made upon our chief engineer, are alarmed and fear that a swindle is being perpetrated upon them, therefore be it

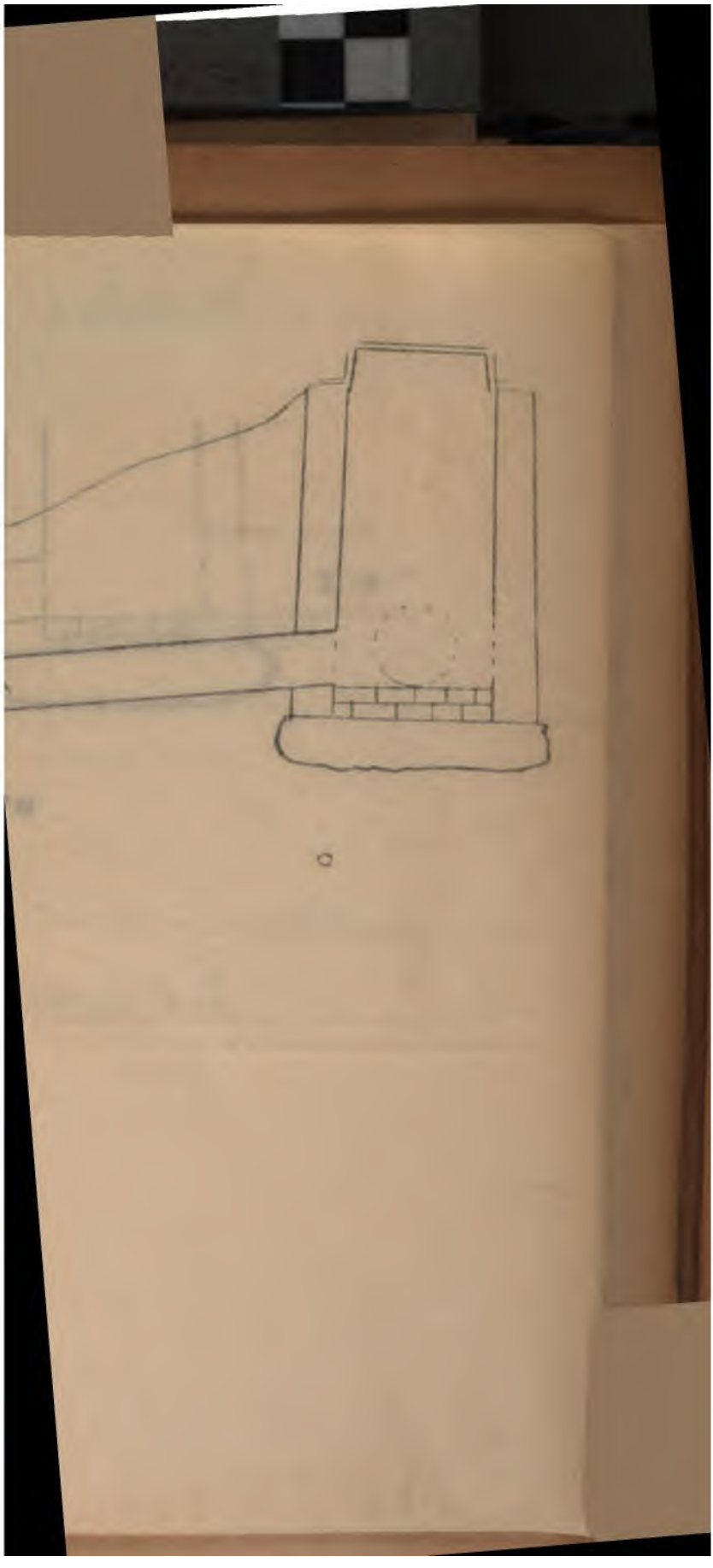
"*Resolved*, That the clerk of this village be and hereby is authorized and directed to immediately request the president of the State Board of Health to send, at the expense of this village,

an expert engineer who shall examine into the work already done by the contractor and report to this board as to its quality at as early a date as may be practicable."

I have the following report to make of my examination, after a careful study of the various features of the case:

An examination of all the completed work is impossible owing to the fact that the plans do not call for pipes straight in grade and line between man-holes and lamp-holes. A test of the pipes in the present unfinished condition with no outlet could only be made by an expenditure of a large amount of time and money. Such a test will be possible when connections are made with the outlet with much less difficulty and expense, if then deemed necessary. I have made as careful an examination as can be made of the work visible and will answer the general question asked in the resolution by saying that the character of the work as a whole is excellent, and that there are no evidences that any swindle is being perpetrated by changes in plan or specifications or by failure to construct the work as required by the specifications. Numerous points have been brought to my notice, where it is claimed that deviations from plan or specifications have been made or poor work has been done. Those that have seemed to me to be of sufficient importance are here noted. But one or two of these are really of importance, as is shown in the statement of them, and none of them show any evidence of incompetence in the engineer, or fraud on the part of any one.

Such slight changes in alignment and grade as have been brought to my notice are of benefit to the sewers rather than injury, and on the whole are not of material benefit or injury to the contractor. None thus far made are sufficient to require them to be submitted to the State Board of Health, whose approval of the sewer plans is required by law. In this list I would mention changes of alignment in the outlet, and in Westchester avenue to avoid passing through arch culverts and bridges, and to straighten lines, and change of depth of sewer below street in Westchester avenue to enable crossing of creek to be made successfully. Judging by our experience with more exposed pipes in Schenectady, there will never be any trouble with the crossing as now laid, caused by the weather. A change of plan at the crossing of the Bronx river by the outlet pipe sufficient to require the approval of the State Board of Health will be required, as I



am informed by the engineer, on account of a discrepancy of two to three feet between the statements of the elevations of the bed of the river along its course, as given in the plans, and the actual elevations as found by the levels taken during the construction. This will not materially affect any part of the system except the river crossing, and the proposed new place of crossing, opposite the large railroad culvert over the creek, will be more favorable to the method of crossing now required than the location through the arch bridge carrying Railroad avenue over the river. It would scarcely be possible to reduce the grade of the outlet below this crossing, and if the true level had been known when the original plans were made, a plan for a crossing similar to one now required would probably have appeared on those plans.

I find but one place in which there has been a departure from the specifications worthy of any attention. This is in the walls of the "Final Precipitation Chamber" of the disposal works, on page 14 of the printed specifications. The specifications call for a wall two feet thick built of "hard-burned Croton brick or blue-stone," while the walls proposed and partly constructed are of "good quality local stone" as elsewhere specified for walls not definitely described, arranged to receive a facing of blue-stone. There is evidently an error in the printed copy of the specifications as quoted above, for on the next page I find the following under the head of "Settling Chambers:" "The outside walls of the precipitation chamber on the inside, and both sides of the various division walls, to a height of three feet above the grade line of same, to be faced with hard-pressed brick or blue-stone." It is the evident intention here to have the walls built of "good quality local stone" as previously specified, and faced with blue-stone or pressed brick. There is no reason why the walls of the "Final Precipitation Chamber" should be of any different construction from the "Settling Chambers." The only use of the lining is to give a smooth, impervious surface, to prevent the deposition of solids or absorption of liquids by the walls, so far as possible. It is therefore not necessary that the whole walls of the final precipitation chamber be built of pressed brick or blue-stone if they are faced with one of those materials. There is then no actual deviation from the evident intention of the specifications.

The quality of the workmanship in laying the sewer pipe depends largely upon the inspectors upon the trenches. In my examination I found very few points upon which to base any criticism, the work in general being of a high standard. In one or two of the sewers I saw some cement protruding into the pipes, which should be removed, and can be by use of a "follower" or other suitable tool. It is stated that these were not laid under the present inspectors. The man-holes were not all in good condition internally, there being deposits of dirt and in some places cement, which will doubtless be cleaned out before the house connections are made. I think I detected evidences of some leakage in one or two below the level of ground water, which should be remedied if possible. Their condition apart from this was excellent where they were said to be finished. I found some water running in three of the lines of sewer which had been constructed through wet ground, viz., Hamilton and Westchester avenues and Broadway. This water may come from three sources as the sewers now stand, leakage of joints of main sewer pipe and of walls of man-holes, leakage of joints of pipes in house connections, leakage through "dead ends" of sewer, branches, and house connection branches. On the day of my first visit, considerable water was running in the Broadway sewer, more than could be attributed to leakage through joints if they had been laid as required in the specifications. Upon investigation, I found that several lines of four-inch house connections had been laid, and, as I am informed, without inspection by the engineer. I requested that one of these house drains be cut off, and found a material reduction in the quantity of water flowing, leaving an amount scarcely more than must be expected in new sewers in wet ground, though laid in the thorough manner required by your specifications; showing quite conclusively that the source of much the greater part of the water was the leakage through joints in the house connection pipes. Since the sewage from your system must all be treated chemically, and some of it must be pumped, it is evident that the amount of leakage must be reduced to a minimum. It seems to me, therefore, that it will be necessary on the ground of economy to have a rigid inspection of every connection made with the sewer, especially in wet ground. The expense of the inspection will be small and will be paid but once, while the expense of pumping and treating the water leaking into the pipes

will continue indefinitely, as the leakage will possibly never stop, and will last longer in any event than in the thoroughly well laid pipes, as the openings for the entrance of water are larger and not so easily stopped by the lodgment of fine earth or sand in them. The amount of water flowing in the Hamilton avenue sewer could be legitimately attributed to leakage through joints in wet ground of well laid pipe, according to your specifications, and I did not look for special sources of leakage. The same may be said of Westchester avenue, and the leakage at the lower end of this line will probably be greater and longer continued than elsewhere, as it is below the level of the creek and ground water, and is thus under water pressure from without. Since the sewage from this line must be pumped as well as treated, it may be advisable to determine accurately the amount of leakage before house connections are made, and so determine approximately whether it would be economical to replace the low section by iron pipe or by extra construction which will reduce the amount of leakage.

Some other minor points have been raised which are of but little moment, and are principally due to the unfinished condition of the work, and will without doubt be properly attended to when their time comes. Such a one is the covering of the outlet pipe. None of them indicate noticeable neglect, much less anything worse, and I have thought it proper not to burden this report with them.

If I may be allowed to make a suggestion I will say that rapid and economical progress and thorough work, especially on the disposal works, will be greatly facilitated by the construction of the outlet below, and I would urge upon you the great importance of securing rights of way for the entire outlet and proceeding with its construction at once.

Respectfully submitted.

CHAS. C. BROWN,
Civil Engineer.

